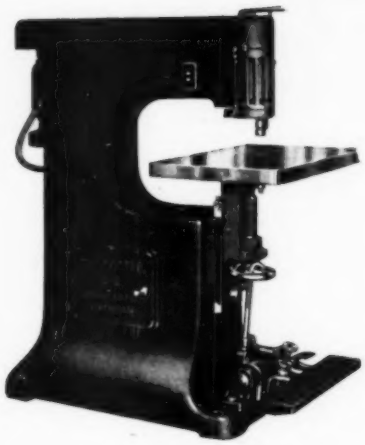
WOOD PRODUCTS



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Smooth Running

The exceptionally sturdy construction of the Porter No. 612—20,000 RPM router and its precision building gives you facilities with which to make cleaner cuts, do it faster, and with a resistance to maintenance that features all Porter equipment.

The bearing lubricating system is automatic, recirculating, positive, clean, and foolproof.

Bulletin sent on request.

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October 1949

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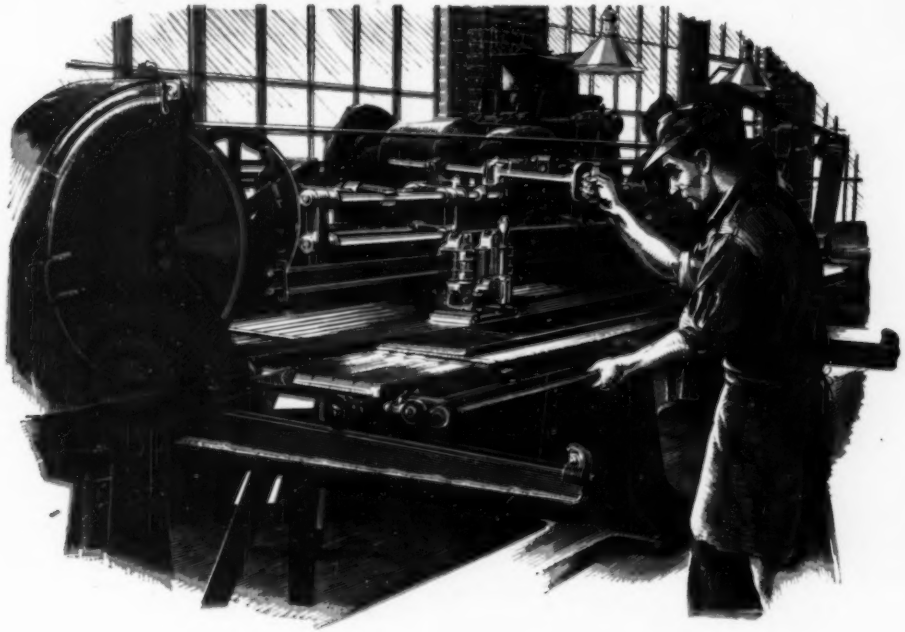

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Apply the 2-Factor Formula

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CARBORUNDUM

TRADE MARK

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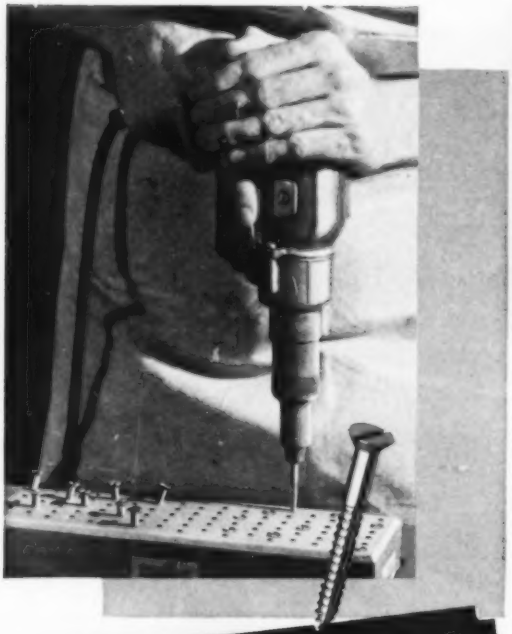

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Avoid costly production hold-ups due to bent or broken screws while driving into hard wood. Eliminate the unsightly appearance of chewed and burred screw heads caused by difficult driving.

Elco speedized wood screws make driving in hard wood a simple matter. Speedizing is a patented lubricating coat applied to wood screw threads to smooth the way for fast driving. It is permanent, it does not come off, it will not stain or soil the wood surface and does not affect the size or fit of the threads.

A comparison will show you the advantages obtained when using Elco Speedized wood screws. Specify Speedized on your next order. Immediate delivery.

FASTEN FASTER with ELCO FASTENERS

ELCO Screws

ELCO TOOL AND SCREW CORPORATION

1908 BROADWAY ROCKFORD, ILLINOIS

WOOD SCREWS • MACHINE SCREWS • MACHINE SCREW NUTS
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TAPPING SCREWS • STOVE BOLTS • PIPE PLUGS

WOOD PRODUCTS

ABC

431 S. Dearborn St., Chicago 5, Illinois

Vol. 54 OCTOBER, 1949 No. 10

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New York: Gerard Velthaus Associates, 152 West 42nd St., Phone, Wisconsin 7-9043.
West Coast: J. A. Converse, 412 Weatherly Bldg., Portland 14, Oregon. Phone Vermont 1814.
Southern California: Richard S. Meyer, 3137 Kelton Ave., Los Angeles 34, California, Phone Bradshaw 2-1456.

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YA

...are better "in the cut"

Strobo-photo of a Yates-American cutterhead turning at 3600 r.p.m. taken with an exposure of only 1/20,000 second.

Producing almost every conceivable wood pattern in plants all over the world, Yates-American cutterheads are proving better "in the cut" because they are . . .

- designed by skilled engineers and precision manufactured by a company with over 66 years' experience in successfully filling woodworking machinery requirements . . .
- carefully manufactured to produce your pattern, uniformly and correctly . . .
- accurately machined in a shop devoted exclusively to production of cutting equipment . . .
- heat treated in a modern, well equipped department that assures complete control over this important phase of manufacture.

Send sketches or samples of patterns desired, along with the name and size of your machine. Our engineers will promptly tell you how *you* can get greater and more accurate production with modern cutterheads — "in the cut."

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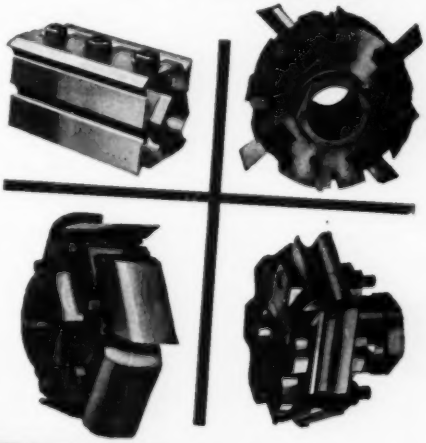

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Diehl No. 900 Electronic Splicer edge joining Vertigrain Laminated Panels, .158 to .170 in thickness and 4½" in width, at the Western Cooperage, Inc., Portland, Ore.

CUTTER GRINDERS

3 popular models—bench and pedestal style.

*Read What these *Users Say about Diehl . . . . . .*

"Our Diehl Tapeless Splicers are making great savings in labor and tape, as the production capacity of a man in the Veneer Department has been doubled since installing these machines . . . our sanding operations have been greatly reduced, and we believe that we can say truthfully that each of these machines will pay for itself in one year's operation."

• • • • •

"We are very highly pleased with our Diehl Power Rip Saw. We couldn't keep house without it."

• • • • •

"We have kept an accurate record of the footage that passed through our Diehl Splicer. For the month of June we made $1882.82. The way we arrive at this figure is by taking the difference in price of regular stock sold and what we get for cut-downs. Really the saving is more than that because we ran up quite a lot of veneer that we would have formerly sent to the boiler room."

*Names furnished on request.

No. 750 RIP-SAW
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THE G. M. DIEHL MACHINE WORKS, INC.

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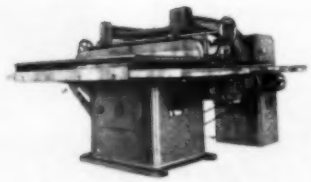
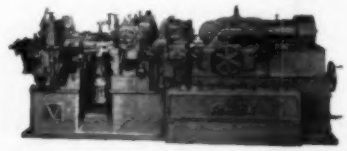
The modern method of edge joining veneers from 1/100" to 3/16"—up to 85 feet per minute.



No. 900 ELECTRONIC SPLICER
For edge joining veneers and core stock from ⅛" to ½" in thickness—up to 40 feet per minute.



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Features the famous trouble-free spindle — operates with maximum economy — 5 sizes . . . 4 to 12 inch, 5 head models.

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One of two Diehl No. 69 Veneer Jointers in operation at the Splicedwood Corporation, Mellen, Wis.

A battery of 5 Vonnegut Moulders at the Forest Products Co., Albuquerque, N. M.

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Stock and custom models. Write for catalog and prices.

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". . . how pleased we are with the 'Diehl Straight Line Rip' that we recently purchased. It is a fine saw, and in our estimation, second to none."

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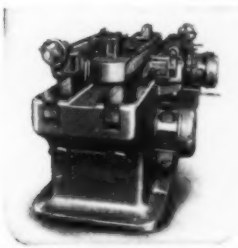
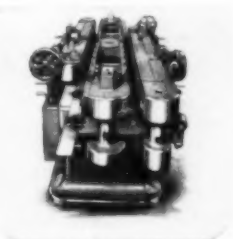
You, too, can profit with Diehl. Your Diehl representative will gladly help you solve your production problems and show you how Diehl machines can cut costs, improve efficiency and workmanship. Write today for illustrated literature and name of your Diehl representative.

W A B A S H , I N D I A N A , U. S. A.

No. 33 RIP-SAW
The Junior of Diehl Rip-Saws—a favorite for planing mills, etc. No. 55 Rip-Saw for glue joints and heavy ripping.



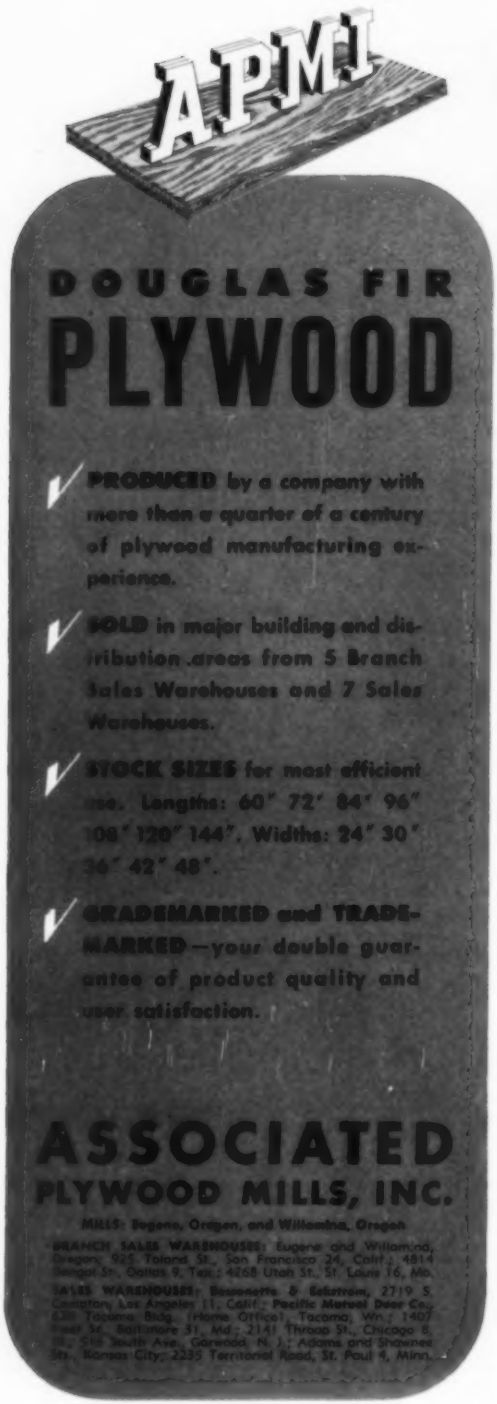
No. 660 GLUE JOINTER AND EDGE MOULDER
Dual purpose machine—cuts intricate mouldings, perfect glue joints—up to 100 F.P.M.



No. 69 VENEER JOINTER
Handles volume production of veneer jointing and edge gluing—in bundles up to 2" thick—up to 50 F.P.M.

No. 725 STRAIGHT-LINE CUT-OFF SAW
Automatic—up to 55 strokes P.M. —thicknesses to 5"—widths to 22". (Also No. 724, manually operated).

No. 200 EDGE GLUING MACHINE
Handles core stock from ⅛" to 2" in thickness—panels up to 37" in width, up to 30 F.P.M.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Question & Comment

Unfinished Chairs

1049—1
Editor, Wood Products:
Can you give us the name of a firm, preferably in the east, who makes chairs, and sells unfinished?

S. L. S.

Sash and Door Assembling Clamps

1049—2
Editor, Wood Products:
I would appreciate very much any information on a company manufacturing sash and door assembling clamps.

R. C. M.

"Wonderwood" . . . What Is It?

1049—3
Editor, Wood Products:
On page 15 of the September issue you mentioned "Wonderwood."
Would you please oblige us with the name of its manufacturer so that we may contact them?

N-L C. S. Co.

Lumber Grading Rules

1049—4
Editor, Wood Products:
I would appreciate it very much if you could inform me whether there is any book available that would enlighten me on the various gradings used in the lumber industry for marking the various quantities of lumber as well as the various species.

H. M. S.

Kelly Hand Router

1049—5
Editor, Wood Products:
Could you supply the name and address of the company who manufactures the Kelly hand router?

T. F. M.

Extra Sheets on Wood Mouldings Available

1049—6
Editor, Wood Products:
In your August copy of Wood Products on pages 20 and 21 respectively, you have a very interesting article on wood mouldings and details of these, especially page 20 on ripping stock and cutter consideration for the above mentioned.
Your paragraph four states the editor will be glad to send extra sheets to subscribers as needed. Would you kindly send us six extra sheets of table of sizes showing finished moulding sizes from rough stock with least waste? We feel that this will be a great help to us in our ripping and cutting.

H & H Lbr. Co.

Racks For Finishing Department

1049—7
Editor, Wood Products:
We are interested in procuring racks for our finishing department. These are to hold table model radio and television cabinets. The shelves should be adjustable to accommodate various sized cabinets.
If you know of any source of supply for these racks, we would greatly appreciate your informing us of same.

R. P. & S.

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cut time and handling costs on dozens of jobs from kiln to crate!

Eliminate wasted steps and motion, save time, with SKIL Saws. On many cut-off operations, in production, packing and crating, fast, accurate, easy handling SKIL Saws provide short cuts, prevent pile-ups on production machinery. Particularly suited for cutting compositions and plastics including bar and table-top materials. SKILSAW'S 25 years of leadership is your assurance that on any portable sawing job—SKIL Saw does it best. Your SKIL Tools Distributor will gladly show you how you can save time and money with SKIL Saws. Call him today.

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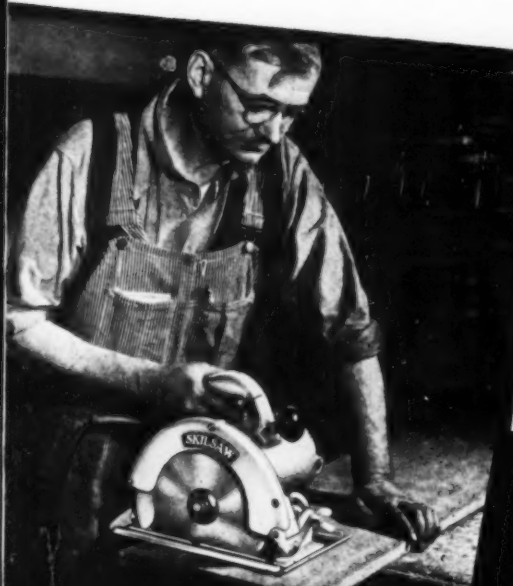

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SKIL Saw is FAST!
Oversize motors supply extra power to handle every job quicker . . . easier.

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SKIL Tools are made only by SKILSAW, INC.

Profits are not the reason for high prices

IF *all* the profits from *all* business firms in America were abolished, prices could be reduced less than 7%. That is, a $200 refrigerator would still cost $186, a $1 cut of meat would be reduced only 7c to 93c. No, profits are not the reason for high prices.

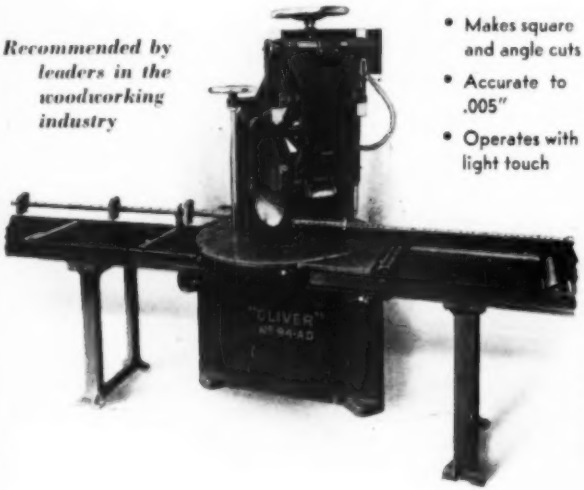
Too much easy money in peoples' hands is the reason, with not enough things to spend it on. People bid against each other for what they want, and up go prices.

The cure is more production per *machine* and per *hour* and per *man*, to bring down costs and to increase supply.

Profits are almost entirely used to buy better tools. This increases production—creates more goods for more people at lower costs. In this way profits *help reduce prices*. When radicals attack corporation profits they are attacking the American high living standard, high wages and jobs.

Source: Survey of Current Business, July 1948

Recommended by leaders in the woodworking industry



- Makes square and angle cuts
- Accurate to .005"
- Operates with light touch

"Oliver" ANGLING CUT-OFF SAW

For ease, speed and accuracy there's no Cut-Off Saw like this "Oliver." With a light touch it cuts a perfectly straight line, and automatically returns to its original locked position without rebound. There are no springs, no slide ways, no overhang. Takes only 18" from wall to back edge of table. Carries circular saws, dado heads or solid cutters from 10" to 18" in diameter. An 18" saw cuts stock 4½" thick. Cuts stock 2"x20" with ease.

Write for Bulletin No. 94-AD.

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Since 1849, Blake & Johnson has been serving industry with successful solutions to fastening problems. That century of experience is yours to command today . . . whatever your problem . . . whatever your product. Our engineers are always glad to work with yours to help select or develop the fastening that provides quickest application, greatest holding power and soundest economy for your particular needs. Call on us.

When you specify Blake & Johnson fastenings—whether machine screw nuts or special threaded fasteners—you know there's a century of know-how behind them.

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Fastenings

Slotted or Phillips head machine screws, wood screws, stove bolts, tapping screws, special headed products; nuts, rivets, chaplets, wire forms, screw machine products . . . in steel, stainless steel, copper, brass, bronze, everdur, nickel, nickel silver, monel, aluminum . . .

1849 – 1949
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TITLE

COMPANY

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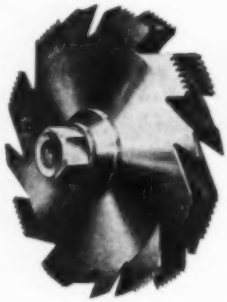

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Wood

You believe it?

All woods would be of the same specific gravity were it not for the fact that because of variation in the size of the cell cavity and its thickness of cell wall, some have more wood substance than others.

?

The principal factors which must be limited in structural grades of lumber are: knots, shakes, checks and slope of grain.

?

Every truckload of timber that rolls out of the Dartmouth land grant 40 miles north of Berlin adds $20 to the college's scholarship fund for indigent students.

The forest land was given to Dartmouth in 1807 to compensate the college for another tract seized by a royal governor in the days before the American revolution.

Terms of the grant required that income from timbering operations be used to help needy undergraduates.

?

Flat Grain flooring is cut with, or on a tangent to, the annual growth ring. It may be equally as hard as vertical grain but does not have the even distribution of hard summer growth found in vertical grain stock and is generally less resistant to wear. Flat grain flooring costs less than vertical grain flooring and where not subjected to heavy wear, or where covered with carpet or linoleum, serves the purpose well.

?

The word "ton" is derived from "tun," the name of a large cask in which wines were once shipped.

?

Sitka spruce is named for Sitka, Alaska, where the Russians started cutting spruce lumber in 1804 and shipping it to the Spaniards and Mexicans in California.

?

Approximately 75% of all residential units are of frame construction.

?

Previous to 1937, production of hardwood plywood exceeded that of softwood plywood. Due to the rapid growth of the Douglas fir plywood industry, production of softwood plywood has exceeded hardwood plywood since 1937, and now constitutes more than $\frac{2}{3}$ of the total output.

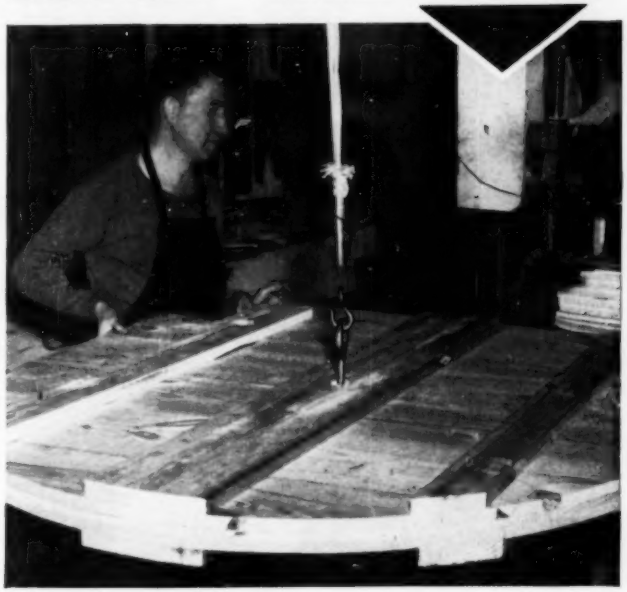
?

No other building material has all the proved advantages of wood.

?

Transportation is the biggest single item in the cost of sawmill logs.

HALF THE TEETH TWICE* THE BITE



* Actual case studies have shown output increased as much as 400% by ATKINS "Skip-Tooth" Band Saws

ATKINS "Skip-Tooth" BAND SAWS

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"Silver Steel" SAWS

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Here's the answer to Lower Shaping Costs . . .

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- LOWER SHAPING COSTS
- UNIFORM WORK OF HIGH QUALITY
- LONG OR SHORT RUNS
- QUICK CHANGE-OVERS
- LESS OPERATOR FATIGUE
- GREATER SAFETY

Write for complete information. Send samples of your work.

WOOD PRODUCTS
NATIONAL MAGAZINE OF THE WOOD PRODUCTS INDUSTRY
431 S. DEARBORN STREET, CHICAGO 5, ILLINOIS

Vol. 54—No. 10 OCTOBER, 1949 25c a Copy, $2 a Year

The Editor's Viewpoint

Wanted: Modern Design in Figured Woods

Approximately 91-million feet of walnut veneers are now available in the veneer industry and its furniture customers are asking for more of some one certain exacting type. Many are overlooking real opportunities by trying to get their requirements out of but four or five per cent of the total inventory, claims Secretary Green of the Walnut Association.

Many designers who create modern furniture slavishly copy the specifications "quartered, pencil-striped walnut, with as little stripe and grain character as possible." In their effort to get what they now consider "perfection," manufacturers often look at a quarter of a million feet of quartered walnut but select only a few thousand feet, the same thing is happening regularly in streamlined oak and quartered mahogany. For whom are we doing all of this lily gilding since consumers love wood as it grows and not as a characterless imitation?

There is really an opportunity for those manufacturers who recognize this situation to select the better buys in other types of walnut veneer, such as wild-hearted sliced wood, pin knotty types, half round, sliced, and even quartered walnut.

In spite of the general tendency of designers in recent years to think that only one type of face veneer makes good modern, namely quartered striped with the least character, there are outstanding examples of designers who have done beautiful modern pieces with the more readily available, less exacting, yet more interesting figure types.

If more designers realized the handicaps they are placing upon manufacturers, they could easily correct the situation.

Our Greatest Enemy

"Thrown out of work by the fire were an estimated 35 persons. Not only was the mill gutted but valuable machinery and 35 cords of wood were lost. The mill was the villages' only industry." So reads in part the description of a fire in a dowel plant in Maine. To most it is just another news item, but to the bread winners and tax payers of West New Portland, Ma., it is mighty important—and tragic news. Stories of this kind are in the papers every day.

Fire is the greatest enemy of our industry, but it can be overcome in great part if ordinary caution is used. There can be no let-up in impressing everyone around the plant that fire rules are there to be obeyed, and that dismissal will result if they are *not* obeyed. This is one point on which management can really get tough and make it stick.

Go through your plant right now and see if your fire extinguishers are in proper working order and handy to reach. What about those sneak smokes that some of the boys are taking? Fire prevention is everyone's business. Tomorrow may be too late. Better take a look around RIGHT NOW.

"The Ajax Wax Company wants to know if their product is satisfactory."

Handling of Assembly Materials in FURNITURE MANUFACTURE

By

W. Burdette Wilkins*

Consulting Engineer, Ridgewood, N. J.

Introduction

In attempting to outline the present data on the handling of parts for assembly of furniture or any wood working item, the subject is so broad that I shall confine my comments to two or three specific problems.

Material handling from the conveyor system and the lift truck angle has been so well covered by various papers that I am not going to attempt to delve further into this but will devote myself to steps in the actual picking up and laying down of the material and rapid and accurate assembly of the parts.

In doing this I will cover three subjects: (1) the assembly of drawers for bureau drawer construction or case goods where a drawer is involved; (2) the application of the adhesive, which after all, is a material (much is being done on spreaders and so forth, but this is an application for assembly gluing); (3) the assembly of case goods involving a mortise and tenon joint, where a case

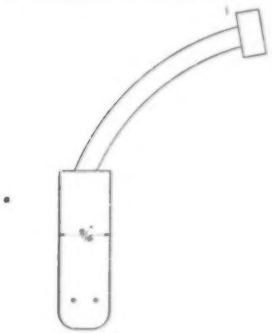

FIGURE 2 -- ROUGH DRAWING OF DEVICE FOR APPLYING GLUE TO A MORTISE

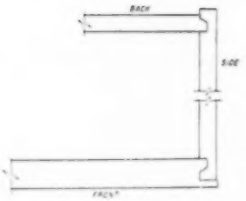

FIGURE 1 -- ROUGH DRAWING OF DRAWER SIDE JOINT

clamp is used and the necessity for production results demands a short time-cycle in the case clamp.

Drawer Assembly

There are several regulation methods of assembling drawers, such as a complete dove tail or a dove tail front with a lock corner back, or, in some instances, various types of joints that depend entirely upon the glue for the strength of the joint. In all cases, the drawer clamp operation has been an assembly proposition where the entire drawer is assembled and placed in the clamp for pressing and squaring. In some cases, the drawer is placed in a clamp with the front and two sides; the clamp is tightened; the three pieces are removed, and the bottom and back put in and the piece put back into the clamp for final pressing. In the case of the dove tail drawer, the dove tail is usually of sufficient strength so that the drawer can be immediately removed from the clamp, and the glue is allowed to set at its own convenience. In the case of some of the other constructions, nails are sometimes applied while the drawer is clamped to hold it while the glue sets. In all of these cases, however, the operator has had a flimsy loose assembly of five pieces to handle, get into his clamp, and keep squared up. This has required some skill in order to speed production, and, in many instances, has led to considerable damage to the drawers, not to mention the all too frequent drawer out of square.

I should like to explain a system that is now in operation in a very sizable furniture plant in the South. This method has been studied carefully and we believe we have a very good set-up for cheap drawer assembly. In the first place, the drawer sides are run on a double end tenoner. We do not use a dove tail joint. This joint depends entirely upon the strength of the glue.

Fig. 1 is a rough drawing of the type of joint that we are using. As you may note, the machining on both ends of the drawer sides is the same. This eliminates the necessity of making rights and lefts and simplifies supplying stock as well as resulting in less difficulty in over-runs or under-

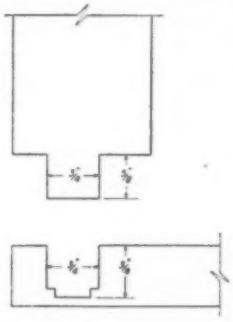

FIGURE 3 -- NORMAL MORTISE AND TENON

*A report presented at the third Annual National Meeting of the Forest Products Research Society held last May 3-4-5 in Grand Rapids, Michigan.

runs of one particular side. These drawer sides are placed in a hopper feed that is so constructed that on touching a lever, the sides come out the bottom of the feed, one at a time, passing under a very rapid pressure feed glue spreader that applies the glue in a fine ribbon exactly in the joint where it is desired. This eliminates smearing the glue all over the drawer sides and eliminates practically all the cleaning-up process that is usually present in the assembly of drawers.

The machinery on which these drawers are assembled is a "squirrel cage type" with five positions. The machine is indexed so that when it is ready to be loaded it is in front of the operator. The operator places a drawer front on the flat guides, picks up two drawer sides from the automatically fed glue applicator, which has applied the glue in the proper place, slides these three pieces, which he can handle easily, into position and trips the first air clamp. This clamps the front edge of the two sides to the front of the drawer and locks them securely. The locking far is a 2-inch wide aluminum bar with an internal electric element capable of producing a temperature of 250° F. The operator then picks up the bottom of the drawer, after the first three pieces are firmly locked in place, and slides it down in the grooves, which are properly aligned with gages. He is then able to spring the drawer sides sufficiently to allow him to insert the back of the drawer. Note that the glue has already been spread on the sides prior to inserting in the machine. The operator now trips the second air clamp, which locks the clamping position at the back of the drawer. Because the front was locked before the bottom was put in and it was locked in perfectly square position, this insures squareness of lock-up.

We found with this setup that after the first month of production the operator was able to make a complete cycle of five drawers in 2 minutes and 15 seconds. This cycle has been kept up at a steady rate for quite some period of time, although this does not include mixing the glue, or loading the magazine, which is done by another man.

Adhesive Handling

In the previous outline of drawer assembly, I mentioned the application of adhesive, particularly the problem of keeping the adhesive exactly where you wanted it and eliminating the necessity of cleaning up afterwards. The same problem is very prevalent in the assembly of case goods with a mortise and tenon joint. Previous practice has always been to apply this adhesive with either a brush or round stick. The glue applicator has been withdrawn from the pot and in most instances the operator applies it to the first, the second, the third, and fourth, and sometimes the fifth mortise. With this method, he usually gets too much glue in the first, slightly too much in the second, about the right amount in the third and fourth, and in all probability, too little adhesive in the fifth mortise. It is impossible to control this type of application accurately because the worker certainly cannot afford to waste the time required to dip the brush for each mortise. Also with this method of application, the bulk of the adhesive is spread around the top surfaces of the mortise and this is not exactly where it should be. It should be down on the sides. One development which has probably helped more than anything else, and a step in the right direction, has been the application of the adhesive with a pressure gun. Most of the nozzles of these guns have been pointed so that at times the adhesive comes out through the point and at other times the point has been blocked off and the glue squirts out of two small holes at the side and back from the point. This has been fairly effective, can be controlled reasonably accurately, and, with a little skill on the part of the operators, they can do quite a good job with it. A new device which we are now using very successfully for applying adhesive to a mortise is shown in Fig. 2. This is a square applicator fitted to the end of a gun; it is hollow; and has two holes on each of the four sides, slightly up from the bottom. The bottom is rounded so that the applicator can always come in contact with the bottom of the hole, even though there might be some chips left in the corner from the hollow chisel. The important factor of this applicator is the distance between the outer walls of the applicator and inner walls of the mortise. This should be gaged accurately so that the correct amount of adhesive is applied to all sides of the mortise joint. With a little skill, the operator can soon tell just when he has applied the right amount of glue. The pressure should be kept on the high side and the viscosity of the glue should also be high so that after application of the glue it will not run out or run to a position where you do not want it even with turning over or turning upside down.

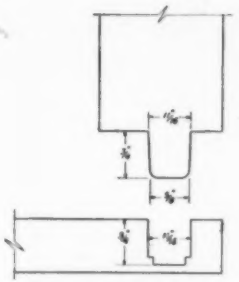

FIGURE 4 -- COMPRESSED MORTISE AND TENON

With a litle study of the proper air pressure back of the adhesive and the proper viscosity of the material, together with the correct size of the applicator holes, it is quite easy to have this set so that just a normal squeeze of the trigger gives the correct amount of adhesive, so that the operator does not have to do any timing. He just makes one closing squeeze and opens it immediately and the correct amount is in there.

Just as a simple explanation and demonstration of what is actually being accomplished in this even distribution of adhesive inside the hole, let us assume that we have a straight strip of glue on the flat area, that the area is 1 inch wide and 4 inches long, and that we have applied the adhesive evenly over the entire area. We now can turn this piece upside down, sideways, or endwise, but the adhesive will not run all over the surface. Now let us put this same amount of adhesive on exactly half the area, which is what is happening in the normal application of adhesive. We are covering half the area with the same amount of adhesive so naturally some of the adhesive is going to run.

Assembly of Cases Using a Mortise and Tenon Joint

In the past, assembly of case goods has demanded what we have called a "knock-up" man. This man takes up the end of the

(*Continued on page* 21)

"WONDERBOARD"

NEW PRODUCT MADE FROM WOOD WASTE

Door panels, cabinets and desks are readily fabricated from Wonderboard panels and permit utilizing extremely fine quality and thin veneers of less than 1/32" thickness. This office and its fixtures in Zurich, Switzerland was fabricated entirely from Wonderboard.

Process Developed in Europe to be Made on Wide Scale Here Through Licensed Manufacturers

Conservation gives birth to a new industry.

Wonderwood Corporation and Bechtel Corporation joined forces in presenting a program to lumber industries, forest conservation officials, and State and Federal conservation agencies, at a two day conference in San Francisco, August 29 and 30.

In attendance at the two day conference were members of the Board of Directors of both organizations, and Richard F. Taylor, president of the Wonderwood Corporation, William Waste, vice-president of the Bechtel Corporation, Charles L. Neely, Plaskon Division of Libbey - Owens - Ford Glass Company, as well as representatives of State and Federal forest conservation and utilization boards.

More than a year in preparation, the program of the conference included the presentation of methods to process waste wood into a finished, saleable product and an outline of plans for a nation-wide plant construction program.

Recognizing the need for a method of utilizing the 59% waste which is currently said to exist in timber stands throughout the nation, Wonderwood has introduced a process which develops, through mechanical means, standard size hardboard sheets. The end product is obtained by blending wood shavings, chips and ground wood with an artificial bonding agent, urea formaldehyde resin solution, and compressing the material in a hot press.

Developed in Switzerland

Fred Fahrni, a native of Zurich, Switzerland and an accredited engineer, conceived a process for the utilization of waste wood in 1940. After years of detailed research, both in the development of the product and the development of production methods, Fahrni introduced his first plant at Klingnau, Switzerland in 1944, designed to produce a highly superior hard board below the market price for competitive production. By 1945 he had a product which was a recognized part of the Swiss economy, the success of which is indicated by the introduction of five additional plants, all of which are now producing the product under the name of Novopan in Czechoslovakia, Denmark, Holland, Belgium and Spain. Backlog orders at all plants have created the need for expansion. Construction is already under way for the enlargement of plant facilities to increase production in Belgium and Czechoslovakia.

Three young Americans actively engaged in construction and engineering stumbled across what they considered to be the answer to the wood shortage and the utilization of waste in the lumber industry. This was the Novopan process. With a sample of the product in hand they determined that American production "know-how" and ingenuity could develop a better program, patterned after the Swiss development, originated by Fahrni.

Plaskon Resins Used

After two months of trans-

Atlantic cable calls, Richard F. Taylor beat a path to Fahrni's doorstep in Zurich, Switzerland. An alliance with the Bechtel Corporation was made and later with the Plaskon Division of Libbey-Owens-Ford Glass Company. The efforts of the tremendous research facilities of Libbey-Owens-Ford Glass Company were focused on the introduction of the Wonderwood process to the United States.

Veneer of Pressed Shavings

Particles contained in this unusual board are so formed as to permit an interlacing among the mass which gives strength and yet by virtue of the air space is an outstanding sound and heat insulator. The particles of wood are arranged in this mass in a random manner so that expansion and fibre strength are compensating. The result is an integrated panel of wood that will not warp, distort, expand or contract.

The surfaces of the board consist of a thin layer of shavings and have a distinctive warm appearance that identifies it as "Wonderboard." It has a hard surface which resists compression, is flexible and bends readily to a radius of five inches, permitting the working of the product into curved shapes for furniture and decor. It is possible to blend any combination of woods, resulting in an important opportunity for combining quality and economy. For example, a hard surfaced board for flooring is made by surfacing a low cost soft wood scrap core with high grade oak shavings—oak scrap can also be used in the core is desirable.

"Wonderboard" has advantages of being resistant to fire, it is nonwarping, and a smooth surface permits the use of thin veneer on one or both sides. It has a high degree of resistance to fungus decay.

Bechtel Corporation, world renowned construction engineers, has developed advanced designed plants for use in the United States. The Wonderwood process will be carried out in plants with one ton, two and one-half ton and five ton per hour production capacities.

As now offered for license the Wonderwood process, through the application of American manufacturing methods, is highly mechanized with push button control holding operating labor costs to an economical minimum. From the time the raw wood enters the plant until it is delivered as a finished board, these advanced designed plants direct the flow of raw material through pneumatic and mechanical conveyors.

Variety of Uses

Standard size 4'x8' sheets, varying in thickness from ¼" to 1⅝", will be manufactured. A smooth, sound surface on both sides, with a decorative pattern in a warm tone, is incorporated into each panel, regardless of thickness.

The properties of Wonderboard make it particularly suitable for use in the manufacture of table tops, cupboards, wardrobes, walls, doors, cabinets and furniture. The panels can be used plain, stained or painted, and are particularly adaptable as a base for fine veneers.

As indoor and outdoor woodwork it has unlimited applications for walls, partitions, ceilings, facings, linings and door panels. For interior decoration the architect or decorator uses Wonderboard panels in halls, lounges, offices, cafes, hotels, restaurants, theatres, chapels and churches.

F.P.R.S. Plans District Meetings; Open to Visitors

A series of meetings has been scheduled by the local sections of the Forest Products Research Society. These meetings offer an opportunity for discussion of local problems in the products field, as men from industry, research laboratories, and educational institutions in the different areas gather to hear papers presented on topics of particular interest to each section.

These meetings are open to nonmembers as well as members of the F.P.R.S. and visitors will be welcome. Anyone interested in attending may obtain detailed information by contacting the secretaries of the local sections or by writing to the national office of the Society at Box 2010 University Station, Madison 5, Wisconsin. Following is the schedule of the meetings:

OCTOBER 25—Pacific Northwest Meeting at the Central Library Hall, Portland, Oregon. The program will be of a general nature with technical papers on a variety of topics of current interest. The meeting will be followed by a banquet at the Mallory Hotel in Portland.

OCTOBER 27—First technical meeting of the Deep South Section will be held in New Orleans, Louisiana. Papers will be presented by members of the Texas Forest Service on "Results of Chemical Seasoning Studies on Oak and Gum" and "The Variability of Extractives in Southern Yellow Pine Wood." The Chicago Mill and Lumber Co. will offer a paper on their Craveneer development, and there will be a variety of other papers. This meeting has been scheduled to follow the annual meeting of the National Lumber Manufacturers Association that will be held in New Orleans earlier in the week, and an invitation is extended to men attending the NLMA meetings to stay over for the F.P.R.S. section meeting.

OCTOBER 31—NOVEMBER 1—Northeast Section Fall Meeting at the Hotel Statler, New York City. On the morning of October 31 there will be papers on "Integrated Utilization of Wood Products," "Wood and Paper as a Combination Material," and "Fiberboard for Shipping Containers." A panel of imported woods will be presented on the afternoon of October 31. Papers scheduled for the morning session on November 1 include "How Moisture is Held in Wood," "Movement of Moisture in Wood," "Fiber Saturation Point," and "Shrinkage and Drying Stresses." The afternoon of November 1 will be broken up into discussion groups concerned with "Seasoning of Wood," "Glues and Gluing," "Material Handling," and "Wood Finishes."

NOVEMBER. 4-5—Virginia - Carolinas Section Fall Meeting at the Student Union Building, Duke University, Durham, North Carolina. The Washington Duke Hotel will be the meeting headquarters. Papers planned for the morning of November 4 include "Collection and Disposal of Wood Waste," and "Wood Waste as a Soil Conditioner." The afternoon session will feature a panel discussion on "Experience in—and Possibilities for—Using Wood Waste." Subjects to be discussed are: "Wood Waste Used for Fuel," "Wood Waste Used for Synthetic Boards," "Chemical Use of Wood Waste," "Use of Mill Ends and Other Waste for Manufacture into Small Products," and "Use of Sawdust, Shavings, Chips and Wood Flour." A banquet will be held at the Washington Duke Hotel on the night of November 4. Field trips have been arranged for the morning of November 5, including a visit to the Duke University wood laboratory.

NOVEMEER 4—Northern California Section Fall Meeting at the San Francisco Auditorium, San Francisco, California. Five technical papers are planned for the afternoon, including "Uses of Redwood in the Chemical Industries," "Surface Coatings and Preservatives for Wood," and "Use of the Electron Microscope in Revealing Wood Cell Wall Structure."

Plywood Production, Chile

In 1948, Chile manufactured 284,200 cubic feet of plywood, compared with 365,500 cubic feet in 1947. Production in 1947 was approximately at capacity, and the outlook for full operations in 1949 is reported to be promising.

In the 5-month period, January to May 1949, Chile reported 85,825 cubic feet of plywood, principally 3-ply stock in standard-size panels, bonded with casein glue. Argentina, traditionally the largest buyer of Chilean plywood, purchased 60,050 cubic feet; whereas shipments to the United Kingdom, normally not a market for Chilean plywood, amounted to 24,133 cubic feet. The remainder of Chilean plywood exports went to Bolivia and Peru.

DIELECTRIC HEAT, RESIN GLUES

Big Aid in Wood Auto Body Assembly

Jamestown, N. Y.—Some automobile manufacturers are giving longer life to wooden station wagon bodies these days and cutting labor and material costs by a dielectric method of gluing, The American Society of Mechanical Engineers has learned.

The method is so flexible that it meets easily the changing requirements of new streamlining, W. H. Hickok, director of application engineering, Thermex Division, Girdler Corporation, Louisville, Ky., told the society's Wood Industries Conference in the Hotel Jamestown recently.

Briefly, it consists of using high frequency electrical energy to supply the heat necessary to set the phenolic resin used as glue to join the wood members of door and body sections. The joints to be glued are spread with penetrating phenolic resin and allowed to air dry. These are then respread with a viscous coat of resin, placed into their proper position in the electronic assembly jig and the pressure applied. The high frequency energy is then turned on for a few minutes (much as the "juice" in an electric chair would be) after which the press is opened and the frame removed.

Old Method Wasteful

Although tradition decrees that the station wagon body be made of wood, some manufacturers faced with higher costs and the added burden of complex styling, have found it expedient to go to an all metal body, said Mr. Hickok. Even so, the metal is formed and finished to simulate wood, he pointed out.

"The usual method of production applied to modern styling would require starting with large billets of high grade hardwood and would finish with only a small fraction of the original piece," Mr. Hickok declared. "The supply of such wood is limited. Furthermore, most of this lost wood would be due to shaping operations, an operation where the labor cost is relatively high."

Phenolic resin, Mr. Hickok said, has been used for many years especially in the production of aircraft parts made of wood. During the war, the Ford Motor Company's Iron Mountain Plant in Michigan where Mercury and Ford station wagon bodies are produced, turned out gliders for transporting troops and supplies by air. A wealth of experience was gained in the technique of bonding wood with synthetic resins. As a consequence, said Mr. Hickok, a study was made at the end of the war of the feasibility of using laminated members for station wagon bodies.

60% Labor, 50% Floor Space, 33% Wood Saved

Production was begun, he said, after a survey of the required equipment indicated that savings of 50 percent in floor space, 33 percent in wood and 60 percent in labor would be achieved. He said that Ford is probably the first manufacturer to use this adhesive extensively in the production of station wagon bodies, adding that Chrysler is another manufacturer now using high frequency equipment extensively in the production of "Town and Country" bodies.

Besides substantial savings of labor, space and material, the use of high frequency and phenolic resin offers other tremendous advantages, Mr. Hickok said. Light colored glue lines, completely waterproof and stronger than the wood, are obtained, he said, with every indication that these glue lines will outlast the life of the car.

"The flexibility of high frequency operation is also a decided advantage. A new curve or a new model may be produced with much less effort and expense than was possible by the old method. Certain design techniques are now possible and practical that would have been prohibitive before."

The laminated sections and the areas around the glued joints indicate, he said, that a type of wood sealing occurs which prevents the discoloration that so often occurred in the past.

Alternative Methods Considered

Mr. Hickok said that after a certain type of phenolic resin had been selected by Ford chemists as the best adhesive, two other methods besides the use of high frequency were considered to obtain the heat needed to effect the cure of the resin. They were: first, the use of hot presses; second, the use of clamping jigs and a hot room.

They were eliminated, he stated, after it was determined that the first method would be extremely expensive since many different compound curved pieces would be required and many expensive heated cauls would be necessary. Added to initial cost of such cauls, he said, would be the variable cycle of heating, depending upon the thickness of the work.

"The second method would require many large jigs since the work would have to be stored in a hot room for several hours," he said. "The jigs would be an expensive investment with the further disadvantage that many square feet of floor space and much handling of the work would be required."

Future Methods

As for future production methods at Ford, Mr. Hickok revealed that a method has been developed to use phenolic resin for bonding the quarter and door frames to their plywood, thereby eliminating the much more costly operation of drilling and using wood screws. Solution of the problem, he said, required compatibility of the plywood finish and the adhesive, and the design of a proper jig and electrode system.

"Although some solid stock is still used in the bodies a study is being made to determine whether or not laminating would be advantageous for these parts. Should this take place, all station wagon work by Ford would be 100 percent phenolic resin bonded by high frequency."

Furniture Assembly Materials

(*Continued from page* 17)

case, applies the adhesive and then proceeds to drive in the tenons with a rubber hammer. In some cases, considerable driving has to be done, as it is impossible to make perfect fits. In other cases, I have seen these tenons go in quite loosely so that the operator has trouble with them falling out in handling the case to the clamp. Also I have even seen them so tight that they have split the rail. The normal procedure from this point on is for the case clamp man to place this assembled case in the case clamp, close his clamp, and, due to the fact that his glue does not set immediately, he in most cases has to nail the joint so as to hold it until the glue has had time to set. Naturally, this nail does not hold the case as rigid and firm as the glue would hold it and if the case gets a severe jar or bump immediately upon being removed from the clamp, it may be knocked out of square and cause trouble later when one attempts to fit the drawers.

Fig. 3 shows a drawing of a normal mortise and tenon joint, while Fig. 4 shows a drawing of a compressed tenon and its mating mortise, showing the differences in size. Note that the square tenon is $\frac{1}{8}$ inch shorter. Note also the rounded end on the compressed tenon for easy entrance, which in the following setup is a very important factor. We have taken for an example the common $\frac{3}{4}$-inch square mortise and tenon joint. In normal fashion, the tenon is run on a double end tenoner from $\frac{3}{4}$-inch stock, giving a shoulder with a $\frac{3}{4}$-inch tenon, $\frac{3}{4}$ inch square. The hollow chisel is $\frac{3}{4}$ inch, giving a $\frac{3}{4}$-inch mortise. The normal setup on this is to cut the mortise depth as deep as possible, depending upon the thickness of the end. But in all cases, there is an accumulation of chips in the corner where the chisel does not go quite so deep as the bit. Naturally it is necessary to cut the tenon enough shorter to allow for this. If the tenons are too long, the chips in the bottom prevent them from fitting tightly and there will be trouble.

We have found from experience that with the compressed tenon we can run a tenon a full eighth of an inch longer than we could with the normal setup. This rounded end on the tenon will go down into the rounded drill hole and will fit tightly when the moisture of the adhesive is absorbed.

With the compressed tenon and the draw clamp, we work with an entirely different procedure. We have racks fitted into the case clamp to receive the tenoned pieces. If the dust bottom assemblies are made up first, then the complete assembly is put in. If no dust bottoms are used, individual rails are put in position in the jig. The glue is then applied to the two assembled ends in a normal fashion. The ends are slipped into the case clamp and the clamp is closed. The operator then puts the glue into the mortise in the ends of his next assembly and assembles his rails ready to be put into the clamp. This process usually occupies anywhere from 30 to 60 seconds, which is time enough for the water in the adhesive to start the swelling action of the tenons. The operator can then remove his case from the clamp without any nailing. The case has been found to be very firm and rigid at this point, and, as you can see, we have entirely eliminated a "knockup" man. We have entirely eliminated the possibility of split rails. The fits are bound to be perfect and one thing that is quite important, due to the glue spread applicator previously mentioned, we do not have an excessive amount of glue to be cleaned up at a later date.

I want to emphasize again that it is the rounded ends on the tenons that make possible the assembly of the case in the case clamp.

One thing that I have not mentioned at all but which is a very important factor is the increased strength of the joint. Table 1 shows the results of a test run at the American Furniture Company. The mortise end was suspended flat with the tenoned rail extending down 10 inches. A 100-pound weight was attached at the bottom of the rail and allowed to swing in a 16-inch arc. The figures shown are the number of complete swings before the joint failed.

TABLE 1.—COMPARISON BETWEEN STRENGTH OF STANDARD TENON AND COMPRESSED TENON JOINTS

Standard Tenon			Compressed Tenon		
Specimen No.	Total failure	Wood failure Percent	Specimen No.	Total failure	Wood failure Percent
1	13	50	101	50	65
2	4	20	102	31	60
3	61	70	103	96	100
4	6	25	104	87	100
5	9	30	105	42	65
6	33	60	106	181	100
7	22	60	107	81	100
Av.	21	45	Av.	81	84

[1]Tension failure.

Note that the strength of the poorest expanded joint was almost as high as that of the best normal joint and that some of the expanded joints showed complete wood failure.

Summary

In summary it can be said that the drawer machine eliminates one handling by using hopper feed glue applicator; eliminates glue cleanup job on interior of drawers; by two step clamping less pieces are handled at one time; and there is assurance of square drawers.

Handling the adhesive as described assures even spread, no excess glue, no running and no dripping when assembly is turned over, no cleanup job afterwards, and saving of glue.

Case assembly as described eliminates a "knockup" man, eliminates nails, gives a longer tenon, and a stronger joint.

Americana

(*From Heppner, Mo., Gazette Times*)

Approximately eighty Heppner people drove to Monument one afternoon recently to participate in official opening ceremonies of the Broadfoot Bros. Big Four Lumber Co. sawmill. Principal showing made by the visitors was the Heppner school band, directed by Robert Collins, which enlivened the occasion and gave the Monument people some of the first band music heard in their community in a number of years.

Sponsored by the Heppner chamber of commerce, no less than 20 cars were employed to carry the band, CC members and other interested citizens. The caravan arrived at the new little industrial center by 3 p.m. and after personal inspection of plant, pond, and for some of the younger folks the town itself, assembled in the sawing plant for a brief program. The Monument school was dismissed a little early and school children and residents of the town and surrounding country gathered at the mill to participate in the ceremonies. It was estimated that approximately 550 people were present.

Nichols to Head Sou. Plywood Mfrs. Assn.

Plan Graders School: See Good Outlook For Business

Members of the Southern Plywood Manufacturers Association met in regular Summer Meeting at the Henry Grady Hotel in Atlanta, Georgia on August 9, 1949.

The southern manufacturers elected D. E. Nichols of Valdosta, Ga., association president and E. A. Biedermann of Dublin, Ga., vice-president. Nichols is president of Valdosta Plywoods, Inc. and Biedermann is president of Georgia Plywood Corp.

Board members named include G. Colucci, president of Southern Box & Lumber Co., Wilmington, N. C.; E. M. Shelton, president of Statesville Plywood & Veneer Co., Statesville, N .C. and J. J. Stern, manager of Southern Plywoods, Greenville, Fla. The two officers also serve as board members.

C. W. Dietterich of Atlanta, Ga. was re-elected managing director.

E. B. Meyercord of Mobile, Ala., the retiring president, was awarded a scroll in appreciation for his vigorous and far-sighted leadership of the association during the past two years.

The business meeting was highlighted by the report of the managing director which reviewed the accomplishments of the past year and outlined those programs to be given emphasis during the coming year.

Ten Thousand Panels Tested

Of particular interest was the success of the Association testing laboratory in the quality control program of the Southern panel manufacturers. During the past year this laboratory has tested ten thousand plywood specimens from twenty-one Southern plywood mills. The expanded uses of this testing laboratory will be given emphasis during the coming year.

Plans also call for the association sponsored Graders School to be placed on a permanent basis to assist in a more uniform understanding of hardwood plywood grades among the manufacturers. These schools will also give guidance to the association's Technical Committee in its cooperative efforts with the Standing Committee for the Hardwood Plywood Commercial Standard. The function of this latter committee is to keep the standard abreast of current conditions.

Association Sectional Meetings will be inaugurated in September. These meetings are designed to establish closer cooperative ties between the association office and its member mills in the persuance of the various association activities.

The general tone of the meeting reflected reasonable optimism concerning the business future for the Southern panel makers.

Louisville Lumberman Buys Another Hotel

J. Graham Brown, Brown Lumber Co., and associated lumber concerns, also owner of the Brown Hotel, Louisville, office buildings, a theater and a number of other projects, is stepping up his hotel holdings through the purchase, September 21, of controlling interest in the Kentucky Hotel, Louisville, Ky.

Ray Arndt Advanced

Ray Arndt, for the past five years manager of the Door Division, United States Plywood Corporation, has just been elected a director of the company, it was announced today.

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We also supply cut-to-length venetian blind parts, flag sticks, plain pine dowels, toy parts and blanks, as well as the well-known smoothly sawn and printed small rectangular cheese boxes.

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Foreign Woods

Origin, Use, Properties and Nomenclature

By **George N. Lamb**

COURBARIL—Hymenaea courbaril
Leguminosae (Pea) Family

This tree is found in the West Indies and on the mainland from Mexico to Bolivia. It is a common tree in many parts of its range. A commercial product of this tree is a yellowish or reddish gum known as South American copal. Its value has decreased since the introduction of synthetic varnishes. The trees range in height from 60 to 120 feet and diameters range from 20 to 48 inches with clear lengths 40 to 70 feet.

The heart wood is russet to reddish brown and often streaked. The sapwood is white or gray. The wood is mostly very hard, heavy, tough and strong but variable. Sp.gr. 0.75 to 1.05. The wood air seasons reasonably well but kiln drying characteristics are unknown.

This wood was formerly known in the European markets where it gained a good reputation in carpentry, construction, boat building and for furniture. It is doubtful that there is a sufficient supply for this wood to become an important import. It does not appear to have veneer possibilities as only the thick sapwood would be attractive for this purpose. In lumber form it could scarcely compete with native species.

Other names:
Common names—*Locust, West Indian, South American*
Spanish America—*Algarroba*
Mexico—*Guapinol*
Salvador—*Copinol*
Brazil—*Jutai-acu, Jatoba*
Venezuela—*Corobore*
Other woods called Courbaril:
Haiti—*Cynometra* (Courbaril)

ANGELIQUE—Dicorynia paraensis
Leguminosae (Pea) Family

This species grows in the Amazon valley and in French and Dutch Guiana. Under ideal conditions it reaches a diameter of 5 feet above the buttress and a height of 150 feet.

The heart wood is russet when freshly cut but darkens to a brown or purplish brown, solid or streaked. It is usually dull on the surface but with golden lustre beneath. Sapwood is white becoming light brown. The wood is variably hard, heavy, tough and strong. Sp.gr. 0.70 to 0.90 air dry; and, 0.54 to 0.63 when oven dry. This wood air dries rather badly and that usually means trouble in the dry kiln. Angelique is reputed to be highly resistant to decay, insects and marine borers.

Formerly Angelique was exported in small quantities and it was considered a rather poor substitute for oak and teak. It is handicapped by varying quantities of silica in the wood. Woods with siilca, such as Albarco and Angelique, have little chance to become popular in the form of lumber. Such woods cut fairly well when steamed for veneer cutting, but Angelique appears to have no possibilities for that purpose.

Other names:
Surinam—*Basra locus*
French Guiana—*Teck de la Guyane, Angelique gris, Angelique rouge*
Brazil—*Angelica do Para*

YELLOW SANDERS—Buchenavia capitata
Combretaceae (Combretum) Family

Yellow Sanders is found in the West Indies and in northern South America, while other species are found in the Amazon valley. The tree reaches a height of 80 feet and may be 3 feet in diameter above the buttresses. The heart wood is yellow to golden brown when seasoned. The sapwood is yellow-brown. The grain is interlocking. It is moderately heavy, hard and strong. Sp.gr. 0.60. Texture is fine to medium. When cut on the quarter the grain may show a mottle figure. The wood seasons fairly well but does not work

(*Continued on next page*)

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Core-Stock and Lumber
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A complete operating package, installed by factory engineers, under single responsibility. Write for bulletin!
Check These Advantages: Endless conveyor — full length platform loading and offbearing; completely automatic operating cycle. Use M and R Radio frequency to secure maximum production and maximum advantages over steam such as: known glue line pressures, solid glue set across the glue line instead of partial penetration, no after warping, no surface burning, no effect on moisture content. Use any resin adhesive. The press illustrated is 33" x 86" for thicknesses up to 8 4". Sizes to order. Fast delivery. Fully licensed under "Parallel Bonding" Patents No. 2,434,573 and 2,457,498.
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easily. It takes a glossy finish but is difficult to glue.

If supplies were available in fair quantities, Yellow Sanders would have some possibilities as a cabinet wood. For veneer manufacture, the figure would be a recommendation but yellow woods never have been popular in this country. If yellow became a desirable novelty, the trade would probably apply a yellow finish to one of the lighter of the staple woods such as avodire.

Other names:
Cuba—*Jucaro amarillo*
Puerto Rico—*Granadillo*
Haiti—*Bois gris-gris*
Trinidad—*Yellow olivier*
Venezuela—*Amarillo Boj*
Colombia—*Almedro*
Surinam—*Gemberhout*
Brazil—*Mirindiba, Periquiteira*

GUAYACAN—Tabebuea guayacan

Bignoniaceae (Bigonia) Family

Guayacan is found from southern Mexico to Colombia and belongs to a large and important Tropical American genus. Trees are from 24" to 36" in diameter, occasionally larger, and reach a height of 90 feet. They may have a clear length of 40 to 50 feet and usually a low buttress.

The heart wood is a yellow green when freshly cut but ages to a dark brown sometimes with a lighter and darker striping or a reddish tinge. Sapwood is a thick creamy white. The grain is interlocking and shows a stripe figure when cut on the quarter. Texture is fine to medium. Sp.gr. 0.80 to 0.91. The wood seasons with some difficulty; is heavy, hard and strong. It is extremely durable and resistant to insect attack. Has been reported sound after 300 years of exposure in Panama. Is rather difficult to work. Because of its lack of oil, it is a poor substitute for Lignum Vitae. It has some possibilities for heavy construction and marine work but little prospects as a cabinet wood.

Other names:
U. S. A.—*Bastard Lignum Vitae, bethebera, yellow guayacan*
Tobago—*Cogwood*
Mexico—*Amapa, Roble*
Guat., Hond., Salv., Nic.—*Cortez*
Costa Rica—*Corteza*
Other woods called *Guayacan:*
Colombia—*Arthrosamanea* (Guayacan)
Columbia—*Centrolobium* (Guayacan hobo)
Colombia—*Poponax* (G. trapiche trupi)
Colombia—*Zygia* (G. chaparro)
Colombia—*Lafoensia* (Guayacan)
Cuba—*Behaimia* (Guayacan)
Honduras—*Chloroleucon* (Guayacan)
Honduras—*Lonchocarpus* (Guayacan)
Mexico—*Sweetia* (Guayacan)
Paraguay, Argentine—*Libidibia* (Guayacan)
Salvador—*Myrospermum* (Guayacan)
Salvador—*Pithecolobium* (G. blanco)

Form Tree Farm Plan

The American Tree Farm System added another state Sept. 9 when Missouri officially launched its program with dedication ceremonies held near Eminence in Shannon county.

The state, the 25th to adopt the Tree Farm plan, is out to improve management and protection practices on more than 15 million acres of forest land.

Three properties, representing the types of private forest ownership in Missouri and comprising nearly 88,000 acres, were certified as Tree Farms.

New Finishing Specifications For Maple Flooring

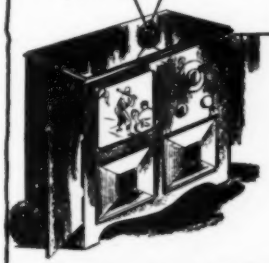
New specifications covering finishes for hardwood floors have been issued for the Maple Flooring Manufacturers Association by Foster D. Snell, Inc., New York chemical consulting firm and official laboratory for the Association.

The 1949 specifications which become official on September 1st, 1949, amend and supersede those issued in 1946. They establish standards for finishes for both heavy duty and gymnasium floors and are designed to give users of these products the benefit of technological improvements in the intervening years. Products found to meet these specifications when tested by the official laboratory are placed on the MFMA approved list issued by the Association from time to time, and can be advertised and sold as approved products.

Principal changes from previous specifications included in the present ones establish numerical values for several test properties left indefinite previously. Toughness is defined by a Kauri reduction test; minimum abrasion resistance for heavy duty finishes is set at an index number of 150 by Taber abraser (250 for gymnasium finishes); color must be not darker than No. 13 by Gardner Color Standard; Sward Hardness of the film must be at least 24; maximum viscosity is specified as A2 on the Gardner scale (C for gymnasium finishes); and a new test covers resistance to alcohol and naphtha.

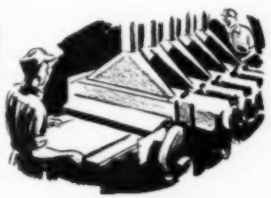
Copies of the specifications can be had by those interested from Foster D. Snell, Inc., 29 West 15th Street, New York 11, N. Y., or from the Maple Flooring Manufacturers Association, 46 Washington Boulevard, Oshkosh, Wisconsin.

Make Visible Savings with Jewel Abrasives



FOR BETTER SANDING RESULTS, TRY HEAT-RESISTING BONDITE GARNET PAPER BELTS. ALL JEWEL ABRASIVE BELTS HAVE THE EXCLUSIVE, SMOOTH-RUNNING VELVET JOINT.

SPECIALLY PROCESSED JEWEL GARNET BELTS ARE WIDELY USED IN THE FURNITURE INDUSTRY TO BRING OUT THE NATURAL BEAUTY OF FINE WOOD.



DRUM SANDER PRODUCTION HAS BEEN BOOSTED AS MUCH AS 800% WITH AMAZING BONDEX GARNET FIBRE. ASK YOUR DISTRIBUTOR OR WRITE FOR DETAILS.

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Abrasive Products, Inc.

WOOD FIBERS *from* VENEER WASTE

By

Armin Elmendorf *

President, Elmendorf Research, Inc.
Chicago, Illinois

Fig. 1.—Machine designed by Elmendorf Research, Inc. for converting veneer waste into strand-like fibers. (Courtesy of the Harbor Plywood Corporation.)

Practically all persons visiting plywood factories for the first time are impressed with the vast amount of veneer that falls into the waste conveyor and is carried from there to the power house to be used as fuel.

When used as fuel, veneer waste is worth only about $4.00 to $6.00 per ton, dry basis, depending upon the current value of competitive fuels, such as oil or coal. Roughly speaking, if coal costs $12.00 per ton, wood waste is worth about $6.00 per ton, as the fuel value of wood is about one-half that of coal. The problem in utilizing veneer waste is, therefore, to give it a value exceeding $6.00 per ton. It should be borne in mind, of course, that in some localities wood waste is worth substantially less than $6.00 per ton; whereas in others, as for example those near a paper mill, veneer waste that is free of bark may sometimes command more than double this price.

Possibly the most unique property of wood is its high tensile strength parallel to the grain per unit of weight. It has been frequently pointed out that in this respect some woods are superior to mild steel. If wood is converted into long strands or fibers, its high tensile strength and stiffness can be used, but it is imperative that such fibers have ample length so that they can be held adequately with binders. This means, furthermore, that the fibers or strands must have a small cross section, for otherwise the resistance to rupture will exceed the bonding strength with which the fiber is held in place.

A balance between strength of bond and tensile strength is highly desirable. In veneer waste we have a uniquely useful raw material in that one dimension of the desired strands has been established by the act of cuting the veneer. By cutting the edge of veneer in a manner resembling that of planing the edge of a board we obtain strands or fibers whose width is the thickness of the veneer, and whose other dimensions, namely thickness and length can be controlled. The thickness, as previously stated, should be as small as is mechanically feasible in order that the tensile strength of the resultant strand may not be greater than the strength of the bond holding it in place. Tests made by Elmendorf Research, Inc. have shown that strands of this kind can be economically cut if their thickness ranges from about 0.010 to 0.015 inches.

The optimum length of the strand is determined by two considerations. As previously stated, it must be adequate to provide sufficient length for bonding purposes, but on the other hand its length must not be so excessive that it introduces mechanical difficulties in the formation of the desired end product. We have found that new types of wall board can be made of the veneer waste fibers. It is highly desirable that all hand labor be eliminated in the manufacture of such boards. In order to be able to felt the fibers into a uniform, board-like product by mechanical means, we have found it necessary to limit the length to about 6 or 8 inches. Fibers of conventional excelsior length tend to snarl and lump and, therefore, do not lend themselves to mechanical felting. For this purpose most of the fibers must be thrown and deposited as individual strands. On the other hand, unless the strands are at least 1 to 2 inches long they do not, as a rule, provide adequate bonding strength.

To summarize: For the best utilization of veneer waste in the manufacture of new wall boards and building slabs, it appears that the fibers or strands into which the veneer is converted should have a width equal to the thickness of the veneer, a strand thickness of from 0.010 to 0.015 inches and a strand length ranging from 1 to 8 inches.

Fiber Cutting Machine

Considerable work has been done in the laboratory of Elmendorf Research, Inc., over a period of years in the development of a machine that would produce fib-

*A report presented at the third Annual National Meeting of the Forest Products Research Society held last May 3-4 and 5 in Grand Rapids, Michigan.

ers of the type and size mentioned. A great deal of our research work has also gone into the utilization of such fibers for the production of useful board-like products. Following the successful completion of a laboratory machine for reducing veneer waste to fibers of the type described, a full-sized machine for cutting fibers in commercial quantities was built. The latter machine has now been completed and tested. It, too, produces the desired fibers.

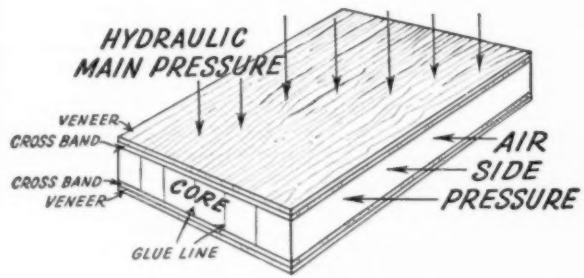
Veneer waste of random width, shape and thickness, previously cut to a maximum length of 1 foot is placed upon a conveyor belt that carries it forward into the clamping mechanism, which in turn feeds it continuously against the face of the cutting disc. All types of green veneer waste commonly observed in waste conveyors can be used, as for example, fish tails, narrow strips, split veneers, and knotty material. In its progress to the cutting disc, the bed of randomly placed veneers, which is about 4 inches thick, is cut down the middle with a circular saw, thereby producing two separate continuous beds each 4 inches thick and 6 inches wide.

The flat side of the strands cut is edge-grained and when such strands are felted the broad surface of most strands lies parallel to the faces of the resultant board. The advantages inherent in edge-grained wood are thereby incorporated in the board. The dimensional changes of wood in the radial direction due to moisture changes are roughly only about one-half of those in the tangential direction. As minimum dimensional change is one of the most important physical properties of all wall boards, it is highly desirable that the strands be so cut and placed that they show edge-grain when positioned in the final board. This is the result obtained with the fibers produced by the fiber cutting machine we have designed and built.

The machine illustrated cuts $\frac{1}{8}$-inch and 1/10-inch Douglas fir veneer waste into fibers at the rate of about one ton per hour. In commercial use these fibers will be drawn away from the fiber cutting machine by air suction to be transferred either to a dryer, or to be carried in the green state to mixing machinery for coating with appropriate binders.

Veneer Fiber Boards

Various binders can be used for binding together the fibers produced with the machine described, but of these, two types are of major importance. One type of binder producing a highly useful board is the synthetic resin binder, such as, urea and phenol formaldehyde resins. On account of their cost, such resins must be used in the minimum amount consistent with obtaining the desired physical properties in the end product. If urea resin is used, satisfactory bonds can be obtained with a resin content ranging from 10 to 20 percent. The fibers freshly coated can be bonded in a hot-plate press without surface ventilation, if the pressure used does not shut off internal ventilation within the board. The resultant board must be somewhat porous. Boards having a density of from 0.60 to 0.80 made in this manner have a modulus of rupture ranging from 3,000 to 4,000 p.s.i. Such boards need not be subsequently finished in any manner as the fibers have a thin coat of resin, and the natural color of the wood is substan-



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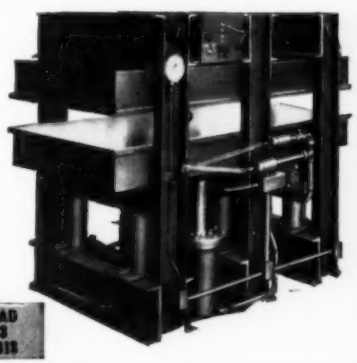

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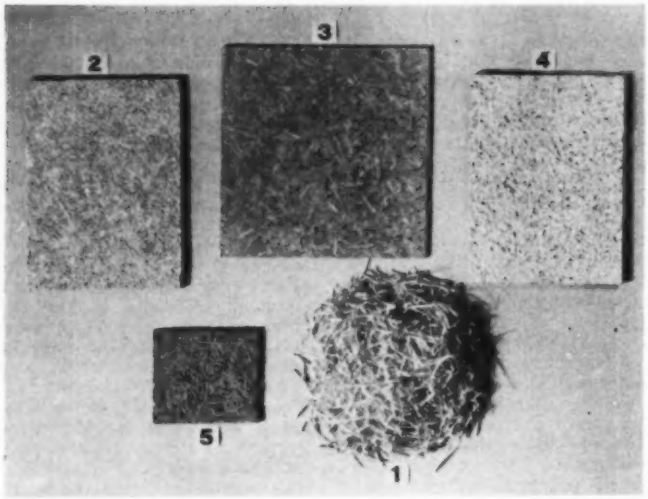


Fig. 2.—Various types of wall board made of veneer waste fibers. (1) Strand-like fibers produced from waste veneer by the Elmendorf fiber cutting machine. (2) A fire-resistant wall board made of veneer waste fibers having a finer fiber in the face. (3) A ¼-inch board made of veneer waste fibers bonded with urea resin. (4) A fire-resistant wall board ½ inch thick made of veneer waste fibers, bonded with an inorganic binder. (5) Sample cut from a plaster base ⅜ inch thick, size 16 by 48 inches, made of veneer waste fibers, bonded with portland cement.

tially maintained. They may, of course, be finished by painting or varnishing if desired.

Wall boards 4 by 8 feet in size and ¼ inch thick have now been produced with the veneer waste fibers. The texture of the board service is attractive and is generally regarded as having excellent decorative value.

When phenolic resins are used, superior weather resistance is provided, but the board produced is darker and, therefore, not so satisfactory for wall board use in house interiors.

Fig. 2 shows various types of wall board made of veneer waste fibers and also a small pile of veneer fibers produced by the fiber cutting machine described. Panel No. 3 in this figure shows a ¼-inch board made with urea binder.

Sample No. 5 in the illustration is cut from a plaster base made of the veneer waste fibers bonded together with portland cement to which certain chemicals have been added. This plaster base is ⅜ inch thick, and 16 by 48 inches in size. Only about one-third of a pound of fibers are required per square foot of board. Being porous, this plaster base provides a superior surface for the keying of plaster. Similar products have been used in Europe for several years on a very large scale. The European products are, however, made of excelsior, which is a much more expensive fiber; furthermore the formation of the board abroad is a hand operation, whereas the veneer fibers produced as described can be mechanically felted.

Observations made in several plywood factories indicate that the weight of the veneer waste may be about one-third the weight of the plywood manufactured. If all the veneer waste available in an average Douglas fir plywood plant could be converted into board for use as a plaster base, the footage of the board produced would equal approximately the footage of the plywood produced by the factor, as only about a third of a pound of fibers is required per square foot.

A third board product that can be made using inorganic binders is shown at No. 2 and No. 4 of Fig. 2. Specimen No. 2 has been given a finer surface texture by the use of a surface layer of fine fibers. Specimen No. 4 shows the texture obtained with fibers cut from ⅛-inch Douglas fir veneer waste. Both boards are ½ inch thick. They are highly fire-resistant, and they are a great deal stronger and stiffer than conventional ½-inch insulation boards. These boards can be made in wall board sizes in a continuous operation by mechanical means, and practically all of the hand labor involved in the manufacture of plywood, for example, can be eliminated. The estimated cost of materials of these boards, in the ½ inch thickness is less than 1 cent per square foot if we assume the veneer waste to be worth $6.00 per ton; and the estimated total manufacturing cost, when produced on an efficient commercial scale, will probably not exceed 1½ cents per square foot. This estimated cost covers all materials, labor, and overhead.

It may be seen, therefore, that new types of highly useful building boards can be made out of veneer waste, and that such boards have some desirable properties that plywood does not have as, for example, fire resistance.

Moreover, when inorganic binders are used, such boards are not only fire-resistant, but if their porosity is maintained in manufacture, they also absorb sound and are useful for sound quieting purposes. They may be used as a base for plaster or they may be painted or left in their natural white color. Their manufacturing cost will be far below that of plywood, and furthermore the total footage that can apparently be produced out of the veneer waste of the plywood industry may approach the total footage of plywood produced by the industry.

FULL SIZE PATTERNS

of

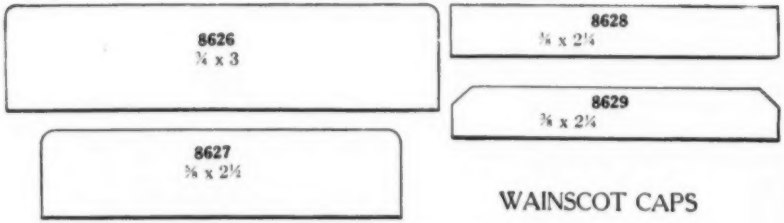
WOOD MOULDINGS

No. 3

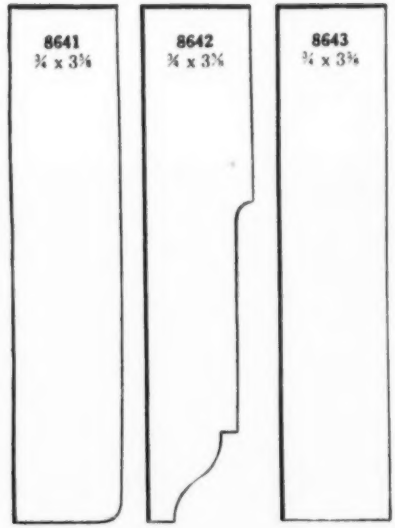
(*See opposite page*)

On the opposite page are shown a number of standard moulding patterns that are in wide use. It will be noted that they are printed in the exact sizes given on each pattern. This is done for the purpose of facilitating the ordering of mouldings, for the use of the knife grinding department and for those firms who may want to order ground knives or milled to pattern cutter heads from one of the several firms specializing in that type of work.

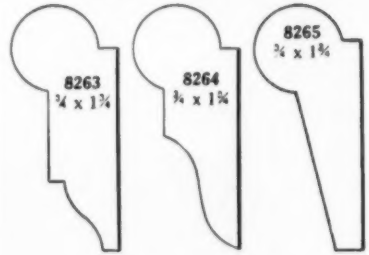
HOOK STRIPS



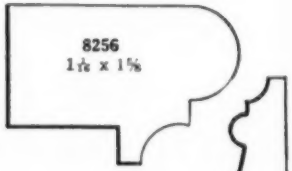
APRONS



PICTURE MOULDINGS



WAINSCOT CAPS



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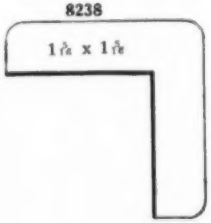
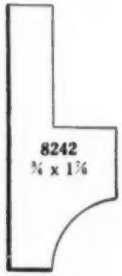
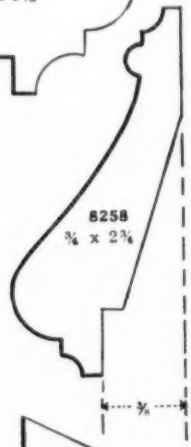
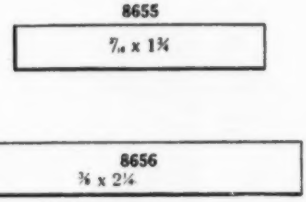


SHELF CLEAT

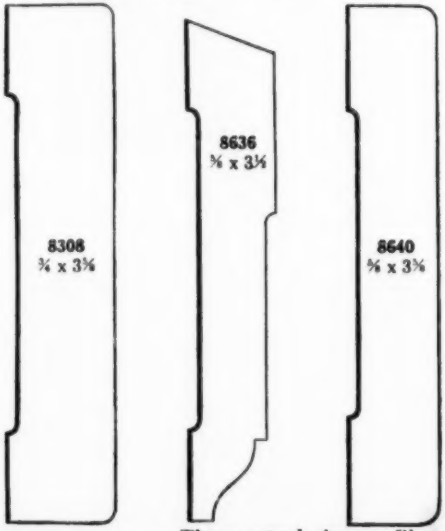


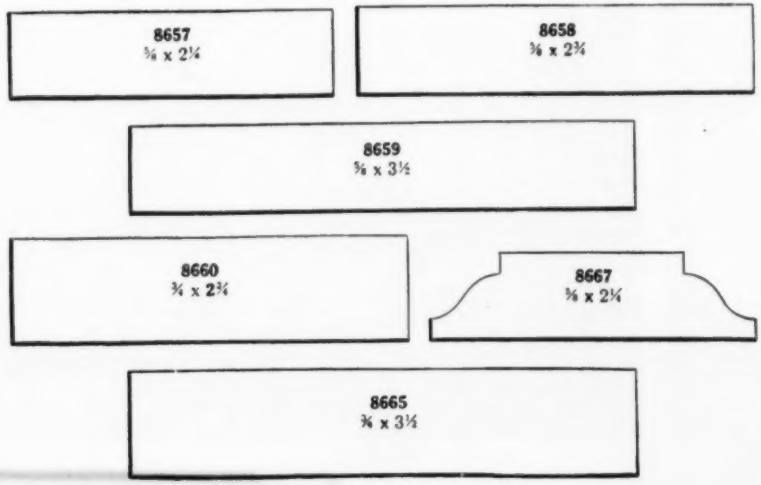


PANEL STRIPS



CHAIR RAIL





These actual size profiles will aid you in knife grinding or in ordering knives and cutter heads or mouldings.

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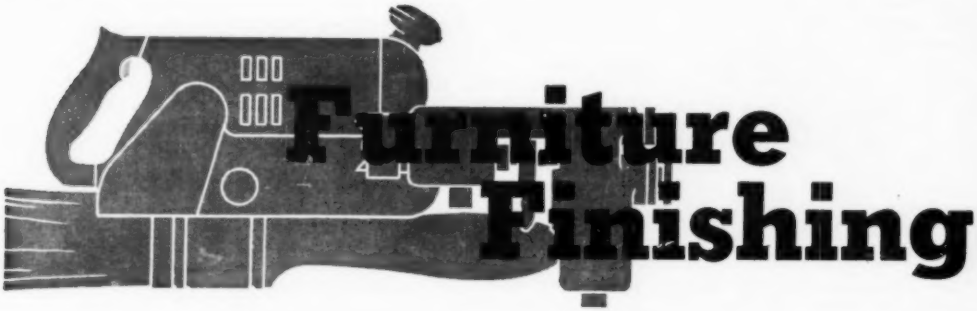

Advances in Wood Finishing Spurred; Labor and Material Cost Reduced by Postwar Seller's Market, A.S.M.E. Hears

Jamestown, N. Y.—Newly married couples to the contrary, the postwar seller's market in furniture has not been as bad as it was pictured. Under pressure to speed its product to a waiting customer, but harried by radically increased labor costs and comparatively slow pre-war production methods, the wood finishing industry has come up with advances of direct benefit to the consumer.

The advances—better and more resistant finishes and clearer and faster drying fillers — were outlined here recently by Paul S. Kennedy, vice president, Finishes Division, Interchemical Corporation, Newark, N. J., at a Wood Industries Conference of The Amercian Society of Mechanical Engineers in the Hotel Jamestown.

Probably the sorest spot in wood finishing materials is the filler which must be applied on open-grain woods such as mahogany, walnut and the like, to give a clear, transparent film effect. Pre-war filler was not only slow-drying—overnight being the usual minimum drying period—but results were unpredictable. Periodically, various ailments developed, such as "graying of pores" and unsightly "muddying," which marred the clear film effect.

Dry in One Hour

When one of these epidemics of graying of pores or muddying of films was encountered, Mr. Kennedy said, the corrective labor expense invariably produced a staggering ultimate price tag. Now, he said, fillers have been developed and are in use which have cut the drying period down to one hour, give top clarity and are absolute proof against pore graying.

"The explanation for this is that the translucent inert pigments used in the filler are themselves actually dyed," said Mr. Kennedy. "They therefore do not 'dry out' or 'wash out' to an unsightly pore condition."

Another advance of tremendous help in reducing material and labor costs especially in fast production, such as radio cabinets, said Mr. Kennedy, has been made with the development of stain filler combinations.

"For example," he explained, "a good quality finish employing stain and filler separately first calls for the material and operation of applying a coat of stain. Next, a sealer wash coat of either lacquer or shellac of low solids content, followed by a scuff-sanding operation. The purpose of this is to seal the pores so that when the filler is subsequently applied, some of its vehicle is not sucked away by stray capillaries in the wood, robbing the full strength of the filler as well as giving 'smeary' pore effects at such points."

Single Operation

With stain filler combination, all of this is combined into a single operation with a single product, said Mr. Kennedy.

He added that the best of these postwar synthetic type fillers do not "heave" like the old fashioned filler. This is temporary "lifting" of pores, he said, which occurs when top coat material is freshly applied, and gives the illusion of a most flushly filled job. Unfortunately when this happens with the old fashioned filler, there is a subsequent collapsing which shows up as "shrinkage," said Mr. Kennedy.

The best of synthetic fillers, he said, frequently look "hungry" by comparison because they are not so affected by freshly applied top coat, with the pore filling remaining fixed. With the continued support and cooperation of the user, he declared, the future outlook for filler is most promising.

Another angle of reduced cost has been developed in the lacquer field, Mr. Kennedy said.

Lacquer is the ideal finish for

wood from the standpoint of speed, saving of floor space and fast and easy touch-up and repair. Heretofore, however, its shortcoming has been what might be termed low solids of film thickness. Various methods have been tried to overcome this deficiency and still maintain a suitable spraying viscosity but they have not proved popular enough for general adoption.

Alcohol Resistant

The trend now, said Mr. Kennedy, is to secure the desired film thickness by means of synthetic coatings of certain base compositions—an alkyd-urea base composition, for instance. Mr. Kennedy revealed that investigations by finishing manufacturers are currently under way with various kinds of synthetics and "further developments can confidently be expected with synthetic clear coatings."

The advent of these synthetic finishes, besides affording savings because of heavier film thickness, introduces varying degrees of resistance which are highly interesting from the sales and service angle," he said. "When cured, many of them have outstanding resistance to alcohol and many other materials which affect lacquer and ordinary varnish films.

Swift Makes New Glue By Improved Methods

A new adhesive product from on old source of raw material has been made possible by Swift & Company through use of a new manufacturing process.

While the use of animal glue is probably as old as recorded history, there have been few real improvements in the method of manufacture until recent years. The principal reason for the slowness with which improvements have taken place is due in part to the difficulty in removing all of the water from the original glue solution as extracted from the raw materials.

In ancient times the glue solution was probably boiled over an open fire to concentrate it, in much the same manner as maple syrup is concentrated today. With the development of the vacuum pan or evaporator it was possible to remove much of the water at relatively low temperatures, thereby preventing loss of quality due to overheating.

For the last century and a half it has been customary to spread on nets concentrated glue liquor previously chilled to a jelly. A large block of glue jelly was sliced into sheets, spread on nets by hand and dried in the open air. Later a machine was developed to chill the solution to a jelly in the form of a continuous sheet which was spread on wire netting and then dried with a current first of cool air and later of warm air in a tunnel.

In all of these methods the glue was continually exposed to contamination from air borne dust and foreign material and from everything it touched. Glue, being such a strong adhesive, frequently pulls the plating from galvanized wire and splinters from the wooden frames of drying racks.

Swift's improved method has the added feature of a continuous closed system for drying.

A continuous belt carries the glue through several air chambers at different speeds and at different temperatures. When completely dried, the glue emerges from the drier in the form of particles resembling raspberries in size and shape. These particles are automatically fed into a mill which grinds them to smaller uniform particles.

Samples of the finished product are withdrawn from time to time and tested in the laboratory so that the final product is uniform. Swift's new process glue never comes in contact with means of contamination. The completely enclosed chambers in which the drying operation is carried on results in a finished product virtually free from dust, cinders, rust, and contamination usually found in tunnel dried glue.

Teco Offers Courses On Testing Wood Adhesives

The Timber Engineering Co., Washington, D. C., has announced a new service—one week training courses in the proper methods for testing wood adhesives.

The training program starts this month and will continue as long as sufficient interest is shown. Subjects to be discussed include: Purposes of testing and evaluating adhesives; types of adhesives and characteristics (including extenders); factors affecting glue joints; handling, storage and care of adhesives; methods of keeping records; wood moisture relationships; preparation of glue shear blocks in accordance with recognized ASTM procedure; testing the shear blocks; testing water resistance; analysis of data; and application of data to commercial practice and requirements.

Each trainee will receive a set of blueprints showing a design of an inexpensive testing machine and shear tool which can be constructed in the machine shop of any furniture factory. His training will include the use of such a machine so that he can return to his employer and not only set up the facilities to continue glue testing but take full charge of the work.

Lumber Shipments Gain Over Production

Lumber shipments of 414 mills reporting to the National Lumber Trade Barometer were 3.6 percent above production for the week ending September 24, 1949. In the same week new orders of these mills were 15.5 percent above average. Unfilled orders of the reporting mills amount to 37 percent of stocks. For reporting softwood mills, unfilled orders are equivalent to 21 days' production at the current rate, and gross stocks are equivalent to 54 days' production.

For the year-to-date, shipments of reporting identical mills were 2.7 percent above production; orders were 4.9 percent above production.

Compared to the average corresponding week of 1935-1949, production of reporting mills was 33.2 percent above; shipments were 42.2 percent above; orders were 51.3 percent above. Compared to the corresponding week in 1948, production of reporting mills was 8.6 percent below; shipments were 4.1 percent above; and new orders were 17.5 percent above.

Door Co. Expands

Dallas, Texas—A new 11,200-square foot building is under construction at 1111 Dragon street in the Trinity Industrial district for the Ready-Hung Door Company. The structure will contain office, display and warehouse space.

The company assembles a package unit inside door including frame trim and hardware.

Hamburg Fur Co. Organized

Buffalo, N. Y.—A business name has been filed in the Erie County clerk's office for the Hamburg Furniture Mfg. Co., Hamburg, by William J. McElhinny and Gordon Williams.

Fire Destroys Wood Plant

Weston, Ont.—Fire destroyed a large planing mill and warehouse owned by the Irvin Lumber Co. Company officials placed loss at "several thousand dollars."

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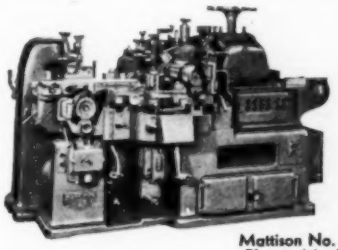

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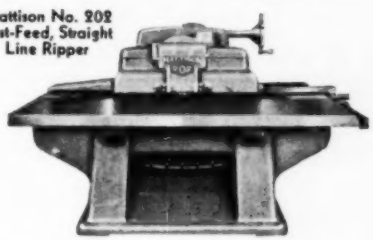

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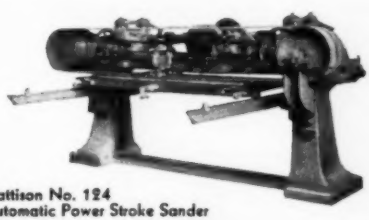

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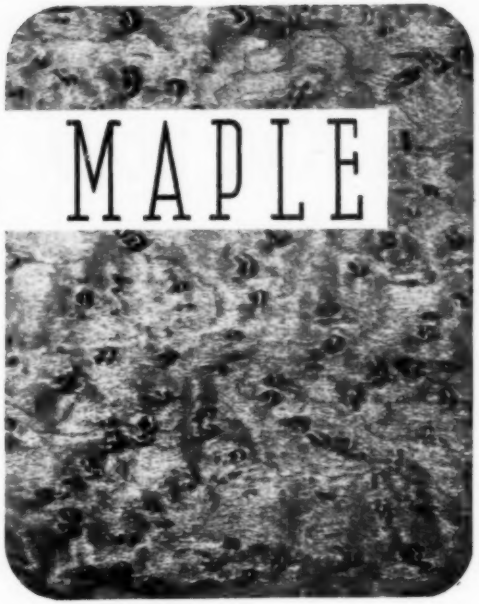

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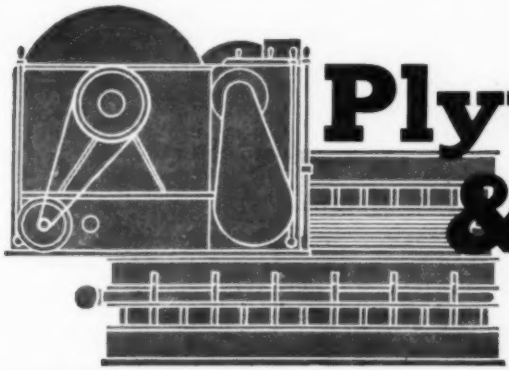


Plywood & Veneer

FABRICATION
APPLICATION

TYPES of PRESSURE APPLICATIONS for GLUING

By

Thomas D. Perry

Pressure, of one type or another, is a prime requisite in successful gluing. Most of us follow, quite unconsciously, the traditional methods, doing what has been done before without analyzing why or whether there is a better method.

The process might be compared to grandmother's delicious gingerbread: "so much of this and that, and a pinch or two of something else, just as I have always done." From time to time, in the woodworking field (but not in the gingerbread area where the writer confesses his abysmal ignorance), it is enlightening to review the possibilities of pressure applications in gluing, and to determine whether the best method is in use and why.

Types of Pressure

There are several principal types of pressure applications in gluing, to which most practices can be related, viz.:

I. Gravity pressure –	uni-directional
II. Screw pressure –	uni-directional
III. Spring pressure –	uni-directional
IV. Piston pressure –	uni-directional
V. Wedge or cam pressure –	uni-directional
VI. Tubular pressure –	multi-directional
VII. Fluid pressure –	omni-directional

There are many variations, within a type, as two or three screws or cams in a single fixture operating in different directions; or between types, where screw and spring pressure are combined, or where spring and tubular pressure are similarly utilized. Other pressure principles are also employed to a lesser degree, such as chain pressure on cylinders, etc.

The illustrations are keyed to the above list, and are combined on one page for comparative purposes. They are not drawn to scale and represent the application of principles, rather than actual working devices. In practice there are often modifications, such as gangs of screws or pistons, controlling and distributing mechanisms, duplex high and low pressure pumps, etc. The basic principles are usually clear, and should be better understood than they are.

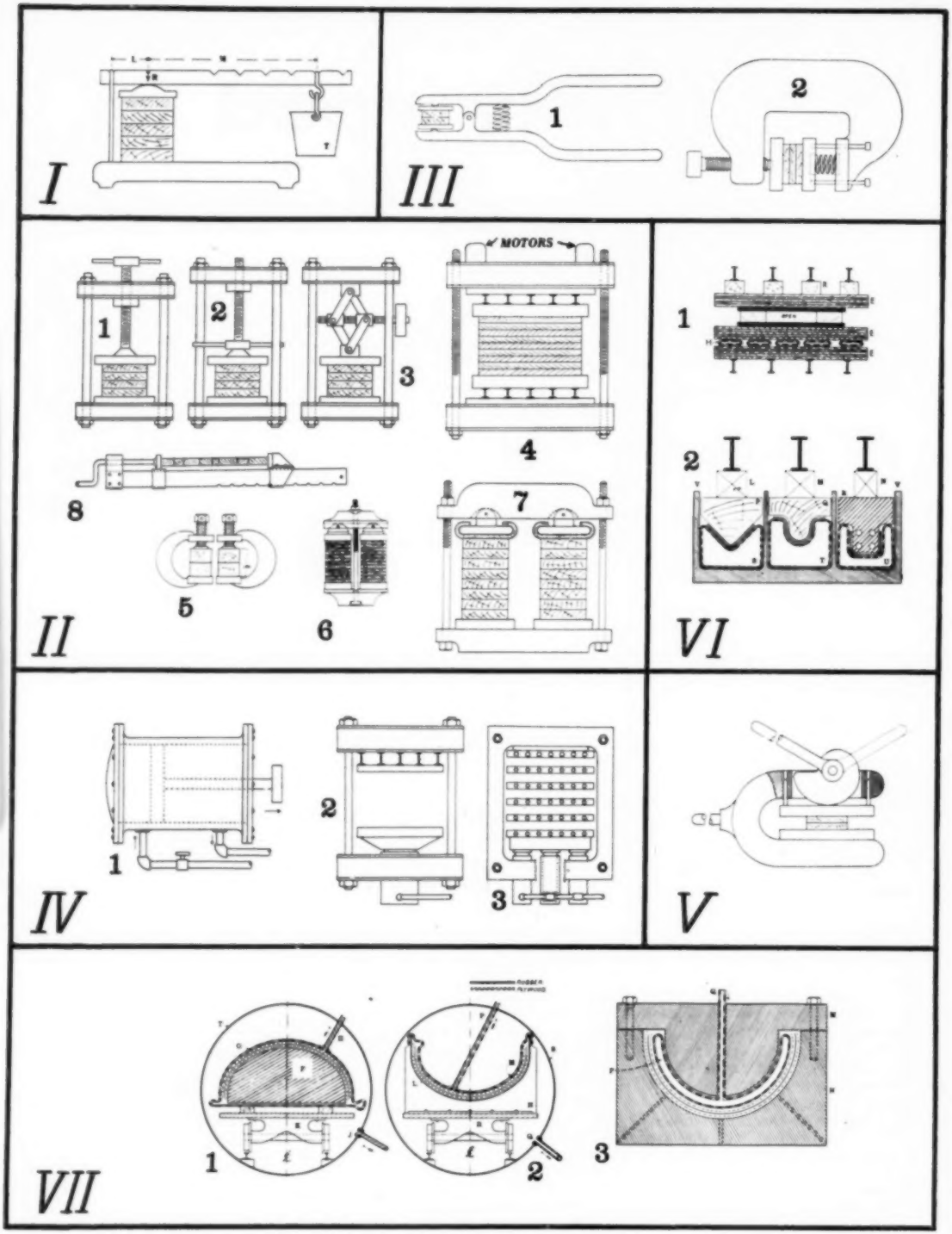
I. Gravity Pressure

This is the oldest known type of pressure mechanism and its use, in the form of bags of sand over the glue joint, is depicted in the bas reliefs of veneering in ancient Egypt, some 3,000 years ago. It has one outstanding advantage, that of continuous and undiminished pressure, which is an important factor in any type of gluing. The intensity of pressure, in pounds per square inch of glue area, is easily computed and, therefore, can be adjusted to requirements.

The application of gravity pressure is a very simple procedure, and can be made effective with a few pieces of wood, some iron rods and a bucket of sand. It is useful in making samples for test purposes, and such a device is shown in Fig. 1. However it may be rather clumsy where substantial areas of glue line are involved, and does not find wide use in the industry.

II. Screw Pressure

This is a type of pressure, which is in universal use in woodworking shops and is found in a variety of fixtures, for edge gluing, assembly gluing and for the manufacture of plywood. Its wide use and the fact that it is so simple and familiar to most workmen, have obscured some of its limitations. One of these is the var-



Types of Pressure Application Devices.
See description under numbered designations in the text.

iability of the intensity of the pressure exerted, even under quite similar conditions. This variability may be rated according to the pitch and diameter of the thread, whether the threads are well oiled or are battered, the length of the lever or wrench, the energy and enthusiasm of the workman, or any combination of these conditions. Another limitation is that screw pressure has no follow-up, as does gravity or spring pressure. The screw or nut remains at the point to which it was tightened, and if the wood shrinks or the wood structure gradually yields under pressure, as is often the case, the actual gluing pressure diminishes at a rapid rate.

There are several ways of determining the approximate intensity of pressure in screw actuated clamps. A torque wrench, registering the foot-pounds produced on a wrench handle of a given length, combined with or following a calibration of an identical screw and wrench with a Compressometer, will provide a reliable uniformity in clamping laminated lumber, as in Fig. II, 6 and 7. In the case of a plywood press, Fig. II, 4, with four corner screws, motor driven, the electrical demand on the motors can be converted into total pounds of pressure on the glue joint area. In other instances, such as revolving clamp carriers or single edge clamps, Fig. II, 8, an experienced workman can obtain reasonably uniform pressure by turning the screw or nut to what he calls *tight*, but neither the workman nor his supervisor know, even with reasonable approximation, what pressure is actually exerted. Another instance is the retainer clamps used in cold press plywood bundles or bales, where the workman with an 18" long iron bar bearing his full weight, is supposed to continue the pressure applied in the hydraulic press on the bale of plywood. Here again human uncertainty may give inconsistent results.

Some of the screw pressures obtained in the toggle joint mechanism, shown in Fig. II, 3, defy analysis or reasonable regulation. The rule in one factory, to tighten until the belt on the clutch pulley slipped, could hardly be expected to give uniform results, and it didn't!

All in all, while screw pressure is widely used in gluing, it needs to be far better understood and regulated than is now the case in most shops.

Where screw pressure is to be distributed over more than one unit of glued work, pivoted equalizing blocks, with or without cushions, such as resilient rubber, are quite essential, as shown in Figs. II, 6 and 7.

III. Spring Pressure

Spring pressure is another of the types that finds only limited use in its simple form, as shown in Fig. III, 1. In this form it is used in repair work and in small assemblies. Calibrated springs, however, are an important part of a torque wrench, originally developed for tightening automobile bolts to a predetermined point. Springs can also be incorporated in "C" or similar clamps, Fig. III, 2, to maintain and continue the pressure originally produced by tightening the screw, thus adding follow-up to normal screw pressure. Such springs must be

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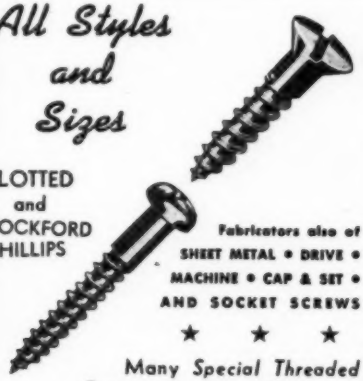

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Spring pressure has the advantage of consistent follow-up characteristics. It can be readily calibrated to maxima and minima, but the pressure cannot be computed.

IV. Piston Pressure

This is the other type, besides screw pressure, that is widely used in the woodworking industry. The piston may be actuated by compressed air, by hydraulic oils, by steam or by water; the latter two being infrequent. This type has the advantage of being readily measured and calculated by the following formulae: (*See formulae below*).
the areas being expressed in square inches and the pressures in pounds per square inch. Specific pressure is that exerted on the glue joint area. Comprehensive data on piston areas and plywood areas are tabulated in *Modern Plywood*, 2nd edition, pp. 396-97.

In general, plywood presses for both room temperature glues and heat reactive resin adhesives, utilize hydraulic pistons, located under the platens to be raised, as shown in Figs. IV, 2 and 3. Single or multiple pistons may be employed. In most cases pumps are twinned together, one large-volume low-pressure to close the press, and the other small-volume high-pressure (up to 3,000 p.s.i.) to build up the pressure to the desired point. Duplex pumps are also used, but are a bit more intricate.

The follow-up feature is usually developed by a regulating valve which stops the pump at the maximum pressure desired and starts it again at approximately five pounds lower. In this way continuous pressure is exerted, since the valve range is relatively insignificant in the pressure on the glue joint.

Pneumatic cylinders, or compressed air actuated pistons, are widely employed in assembly work and cabinet clamps, and are shown in Fig. IV, 1. These units are relatively light in weight and, with flexible hose connections, can be mounted singly or in multiple at any convenient point in any clamping or pressure fixture. However conventional air pressures in most factories are limited to approximately 150 p.s.i., hence pneumatic pressure is seldom practical on glue joints of relatively large areas, such as plywood. Computations and regulating valves are employed as in the case of the hydraulic pressure equipment, described above.

V. Wedge or Can Pressure

In their simplest forms, wedges for exerting pressure, usually in pairs, can be home or shop made, and are frequently useful in emergencies. The intensity of pressure

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Piston area × guage pressure=Glue joint area × Specific pressure
to find the specific pressure when guage pressure is known:

$$\text{(a) Specific pressure} = \frac{\text{Piston area} \times \text{Guage pressure}}{\text{Glue joint area}}$$

to find the required guage pressure for a desired specific pressure:

$$\text{(b) Guage pressure} = \frac{\text{Glue joint area} \times \text{Specific pressure}}{\text{Piston area}}$$

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is not readily measurable and the wedges have no pressure maintenance characteristics. In fact unless the slope is quite flat, they may actually fail to maintain pressure and sometimes are jarred loose.

A modified form of wedge pressure is the eccentric lever or cam, shown in Fig. V, which is quick acting, merely a lever shift, and quite useful in small assembly jobs, where substantial quantities are involved. Pressures are of a low order of intensity, are not measurable, and have no follow-up.

VI. Tubular Pressure

While not in general use, this tubular pressure type has wide applicability to gluing problems within the moderate pressure ranges. Fire hose, some 2½" inside diameter is readily available, capable of carrying pressures up to 400 p.s.i. Where the glued work is flat, layers of hose are placed, deflated, between head blocks as shown in Fig. VI, 1, and within a rigid frame. The inflation of the hose, usually with hot water, creates the desired pressure, but within the limits outlined below. The important feature in tubular pressure, overlooked by many, is the effective area of the hose directly against the head block. The less the inflation or expansion of the hose, the greater the contact area of the hose for pressure transmission. In other words the glue assembly, within the frame, should be blocked down as snugly as possible for the greatest pressure effects, as shown in Fig. VI, 1. Such hose wholly deflated is about 4" wide, and parallel lines of hose can be laid about that distance apart. An expansion of 1" provides 78% of effective contact area; 1½" provides 58%; and 2" provides 36%. For easy figuring, this is the percentage of guage pressure that is effective. Hence hose approaching complete inflation is quite inefficient.

Another application of tubular pressure is shown in Fig. VI, 2, where three sides of the tube are held in a rigid channel, and the other, or top side exposed to the plywood assembly which rests against a curved die or mold. The inflation of the tube will exert its pressure against such a cured surface. This pressure will be perpendicular to a tangent at all points of curvature. The 2½" fire hose mentioned above is rather stiff for such multi-directional pressure, so that thinner and more flexible rubber hose is usually employed. Since these pressures are directly transmitted to the wood surfaces, the contact is almost complete, and intensities of 100 to 150 p.s.i. are usually sufficient. These will be approximately the same as guage pressures.

Still another application might be that of a ring or collar, inside an over size rigid hoop, carrying the inflatable tube on its inner periphery. When inflated such a circular tube would exert equal pressure all around the ring or collar.

Tubular pressure presents many opportunities for new applications to irregularly shaped surfaces and can be made very useful.

VII. Fluid Pressure

This is a descriptive term applied to the pressure type that has been popularly called bag molding. These processes were described at length some two years ago in Wood Products for November 1947 (*Canadian Wood-*

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worker for December 1947) and are added here to complete the outlines of pressure types for gluing. In the case of Fig. VII, 3, the plywood product is half a sphere, using an inflatable bag between the bottom metal mold and the top removable mold. The plywood assembly is made up of veneer cut to the shape of orange peel segments, cross laid after coating with adhesive. Steam pressure is used and the effective pressure is equal to guage pressure, in a direction perpendicular to a tangent of the curve at all points.

In the case of Fig. VII, 2, the steel form is outside and constitutes half of the bag, which is tightly clamped to the edges of a rubber sheet. The complete curved plywood assembly, within the bag, is subject to vacuum pressure to remove the impounded air, and then shifted to an autoclave where steam pressure is applied to the outside of the bag. A similar curved shape can be made on a solid internal mold or form, as shown in Fig. VII, 1.

The effect, in both cases, is omni-directional pressure, in every direction, permitting plywood constructions of simple or compound curvature. Modifications of this process are used for molded plywood furniture, boat hulls and aircraft parts.

Conclusions

This outline of various types of pressure principles is necessarily brief, but affords an opportunity to compare them with each other, within a short reading period. All have found a significant place in the glue rooms of the woodworking industry.

The problem for management to consider is whether they are using the most efficient method for a given problem. What has been done, or what is being done, is not nearly as important as what can be done, providing it is an improvement.

Daniels to Direct Sales of Harbor Plywood Corp.

Portland, Ore.—E. W. Daniels has resigned as chairman of the board of directors of Harbor Plywood Corporation, according to announcement of Martin N. Degeller, president.

This will permit Daniels to devote his entire time to sales matters in his new capacity of director of sales of the corporation and subsidiaries.

Daniels, one of the founders of Harbor Plywood 24 years ago, served as president for ten years before resigning as president and general manager last February to become chairman of the board.

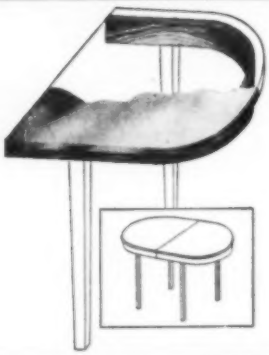
New Thor Sander

Independent Pneumatic Tool Company announces a new Thor Silver Line portable electric belt sander with endless sanding belts 4½" wide by 26" in length.

The new sander features a direct spur gear drive, rapid belt change device, and a new heat radiating system said to increase belt life. This system consists of open-end construction, with belt motion creating air currents to blow generated heat away and heavy-section aluminum fins to conduct heat away to a flat radiating surface which forms the top housing of the tool.

A simplified "tracking" arrangement permits easy centering of the belt on the roller pulleys, and a special internal device prevents belts from wearing away the inner surfaces of the housings.

The sander is available in two models, with or without dust collecting system, consisting of a suction fan and collection bag.



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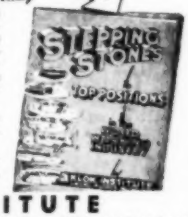

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Perkins Glue Co. Celebrates 50th Anniversary

Two World Wars and three depressions having failed to impede its progress, the Perkins Glue Company this year celebrates the 50th anniversary of its organization.

The Company, for many years a strong corporation, was formed as a partnership between Frank G. Perkins (1866-1910) and Mr. Stryker when they recognized the possibility of converting Tapioca flour into an adhesive for wood-working. At that time the only glue available for furniture and plywood manufacture was of the animal varieties. Perkins original wood glue—known to the trade is "Perkins 183"—was the first successfully conceived vegetable glue.

Net result of the Perkins discovery has been a saving of well over thirty-five million dollars for glue users who preveiously had to be content with animal glues.

Accidental Discovery

Incidentally, the actual discovery of the wood adhesive value of tapioca starch (base ingredient of vegetable glue) was quite accidental. The starch was being examined for possible use as a textile size when a container spilled. Its tackiness gave birth to an inspiration in the minds of Perkins' founders—wouldn't this work for gluing wood! The "inspiration" was followed by perspiration and exactly one hundred and eighty-three tries later Perkins "183" became the first satisfactory wood glue with a vegetable base. Today, Perkins "183" remains an excellent and highly popular glue in daily use!

The first vegetable glue was manufactured in Florida at Lake Mary, where the factory remained for several years. The sales offices were at South Bend, Indiana, close to principal users in the early days. Increased use of Perkins glues soon made freight costs of raw materials and finished glues an important factor and relocation of the factory became necessary. Lansdale, Pa.—on the Reading Railroad and handy to both Philadelphia and New York—proved an ideal spot for a new plant, the one still in use today. The sales offices soon followed and the entire organization was consolidated once more.

During most of its first quarter-century the Perkins Glue Company specialized in vegetable glues and established itself as a leader among glue suppliers. When casein glues proved their worth, especially from a water-resistance standpoint, they were added to the product line following the first World War. Again, the Perkins Glue Company proved its worth to the vast woodworking industry. Perkins casein glues possessed the same excellent quality and were backed by the same superior service as their vegetable glues had had. Perkins recognized the fact that each type of glue had particular advantages and that each was suitable for specific jobs.

All Glue Types

At that time a Perkins policy was born that exists today on an even larger scale. This policy is that through handling all types of wood glues the company can provide completely unbiased advice on the glue type best for a certain operation.

For quite a few years now, Perkins has manufactured resin, casein, prepared animal, and special adhesives such as casein-latex, as well as the original and still popular vegetable glue. New and better glues are constantly being added to the Perkins line. The result is an outstanding line of glues for the woodworking industry.

All Perkins adhesives used in the United States are manufactured under direct control of top management in Lansdale, Pa. Glues sold in Canada are manufactured at the Perkins Glue Company, Ltd. in Kitchener, Ontario. Sales and service operations are also directed from Lansdale with sales offices in strategic locations from coast to coast. Warehouse facilities are maintained in every glue-using center of the nation. The result is an organization tightly knit and yet flexible so that a Perkins glue representative and stocks of Perkins glues are close to every glue user.

One Founder Active

Frank G. Perkins having died in 1910, the passing of his wife, Gertrude Perkins, in 1948 left J. B. B. Stryker, Sr., as the sole remaining member of the original founders and management of the company. Performing a feat most remarkable in American business, Mr. Stryker celebrates his Golden Anniversary with the company as its active president and chairman of the board in its fiftieth year!

Second in command today is James H. Stryker, eldest son of the president. Born and raised in the glue industry, he holds the position of executive vice president in charge of sales. Having been "on the road" himself, James Stryker is ideally fitted to lead a sales

The right glue for the job

"Casie" and "Rezie" will tell You...

"Casein Glues are NOT all the same!"

Here are casein glue numbers to remember: NCS 1012—9—10—30!

After 30 years of exhaustive pioneering, research and development work in casein—and as a result of hundreds of thousands of successful commercial applications, from humble dowels to highest quality veneer work—what "Casie" and "Rezie" tell you about casein glues is provable, demonstrable truth!

NCS No. 1012 Casein Glue is unequalled for finest and thinnest veneers. No stain! No abrasive! Two-day pot life. . . . And a glue that is easy on those costly knives!

NCS No. 9 is the preferred adhesive for hardwoods.

NCS No. 10 is formulated for heavy veneers.

NCS No. 30 is recommended for Formica and plastic top gluing and general millwork.

For nearly a quarter of a century, some of the oldest manufacturers of the finest furniture produced in the furniture centers of the World have depended upon NCS Casein glues to produce bonds worthy of their proud trade names.

National Casein Sales—NCS—is also a preferred source for all types of resin glues. Outline your adhesive project and we'll suggest a glue to do it correctly, readily and economically, without cost or obligation. Write us today!

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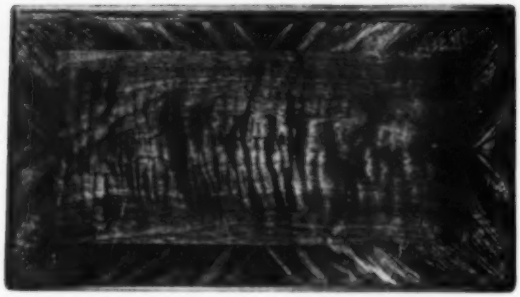

Panel shown at left, a Sewing Machine top, was glued in 1906 with Perkins "183" Vegetable Glue. Subjected to such rigorous tests as being placed on top of a boiler in a hot, steamy room for over a year, the glue bond is as good today as ever. For the past several years the panel has been on unprotected display in the lobby at Perkins' Lansdale plant for inspection by visitors.

staff respected thoughout the industry.

Controlling production in this fiftieth year is J. B. B. Stryker, Jr., also a vice president. Except for service as a Naval officer in the late war, his entire career has also been spent in the glue business. J. B. B. Stryker, Jr., also supervises operations of the Perkins Glue Company of Canada.

Other officers of Perkins at present are E. G. Beer, treasurer, and Miss Nora Schultz, secretary and faithful employee for many years.

Combining the vigor of youth with the experience of age, the Perkins Glue Company today stands at the threshold of its second half-century eager and optimistic for a greater future. Huge kettles are at this moment producing resin glues for the products you will use tomorrow. Casein mixers are humming daily and carloads of vegetable glue pour forth as they have for the fifty years past. Perkins is fifty years young!

Southwestern News

By Staff Correspondent

DeQuincy, La.—Articles of incorporation has been filed by King Alexander, local attorney, for the Southwest Furniture Manufacturing Company, Inc., which will build a furniture manufacturing plant in DeQuincy. The new corporation will issue $50,000 worth of stock at $25 a share. The first $1000 worth of stock has already been sold. Gordon Brown, Edison Jones and A. F. Masingill are in charge of selecting location for the plant, building and machinery details.

DeQuincy was selected as the site for the furniture plant because it is located in the heart of a lumber milling area and is on two principal railroads and a principal highway. Too, about 75 trained furniture upholsterers and specialized workers will be turned out by the Edison's trade school, a G.I. approved furniture-making school, about October 1, 1949, and this available labor was another important factor for establishing the plant in DeQuincy.

Until operations at the plant get well under way, present plans call for the manufacture of only one type of furniture, and later, it is expected that several types will be manufactured at the plant.

* * *

Dallas, Texas—B & J Lumber & Manufacturing Company has amended its

PART BY PART

Part by part, all finished and ready to assemble, Gamble Brothers can help you turn out your novelty furniture for the mid-winter rush. Gamble Brothers' fifty years of experience in wood engineering is helping furniture manufacturers and makers of other wood products to solve their problems of design and production with well-designed dimension hardwoods: solid parts, core stock, curved or flat laminates in lumber or veneer, plastic faced materials. Ask Gamble to help you.

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CUT METAL on your Woodworking Band Saw with

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- Cut metal or wood with the easy Push Pull Knob on the speed converter.
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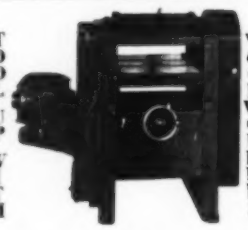

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Low priced: $671.00 with 3 H.P. single phase motor
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You will be interested, too, in our 20" Planer, Plow and Bore Machines, Sash Relishers and Sash Franking Machines. Ask about them.

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charter, (August 22, 1949) decreasing its capital stock to $20,000 (paid all).

* * *

Eureka Springs, Ark.—About $4,000 worth of woodworking machinery was destroyed by fire at the plant of the Bullock Lumber Company here September 1, 1949. Also destroyed in the fire were a carload of Oregon fir which had just been received, three buildings and a large quantity of native pine lumber. The entire loss was estimated at $20,000. Jim Bullock is the owner of the business.

* * *

The Peerless Manufacturing Company has opened a plant at Canton for the purpose of producing furniture for juveniles. Sixteen persons are now employed and additional personnel will be taken on when production reaches capacity.

* * *

B. M. Overstreet, formerly of Greenwood, is plant manager and W. K. Draper is plant superintendent.

* * *

Since the installation of additional saw mill equipment, the Durant Box factory has expanded its activities to include the manufacture of many kinds of hardwood products. The company is now filling orders for truck bodies, bridges, wagon tongues, hay blocks and hardwood lumber for building purposes and other customer needs, Charley Haggard, president, has announced. Haggard also manufactures the egg and poultry crates and other box types which were the original products of the factory.

Southeastern News

By Staff Correspondent

Little Rock, Ark.—The process of converting wood waste into non-warping panels was demonstrated for Arkansas lumbermen in Hotel Marion on October 5. A 20-minute movie on the process was also shown. This method was successfully developed by the Wonderwood Corporation, Los Angeles, California.

One of the biggest problems of Arkansas lumbering is wood waste. A tremendous lot of it is burned to fire boilers, and much of it is allowed to rot.

* * *

Jonesville, La.—Announcement has recently been made that operations will be resumed at the sawmill of the Three Rivers Hardwood Company about November 1, 1949. The mill has been closed for some months due to a reported low price of hardwood lumber.

* * *

Monroe, La.—A fire did approximately $100,000 damage at the plant of the R. W. Butler and Sons Lumber Company at Claiborne, a community about five miles west of Monroe, September 19, 1949. The fire destroyed lumber, equipment and buildings. R. W. Butler and his sons, James H. Butler and Bernard Butler, are owners and operators.

* * *

Winnifield, La.—Mansfield Hardwood Lumber Company has recently installed a Matcher, which will increase the production of finished lumber to around 90 to 100 thousand board feet a day. Harold McCloy is manager of the operations here.

* * *

Ashdown, Ark.—The Red River Package Company filed articles of incorporation September 15, 1949 to operate a veneer plant. The firm listed authorized capital stock as $30,000. Incorporators: Ben Shaver of Texarkana, Arkansas, Beverly E. Brown of Ashdown and J. C. Burton of Dallas, Texas.

* * *

Dermott, Ark.—Sherer Burleigh, 72-year-old Dermott industrialist and owner-manager of the Burleigh Manufacturing Company, which makes handles and dimensional wooden stock, died at his home September 10, 1949.

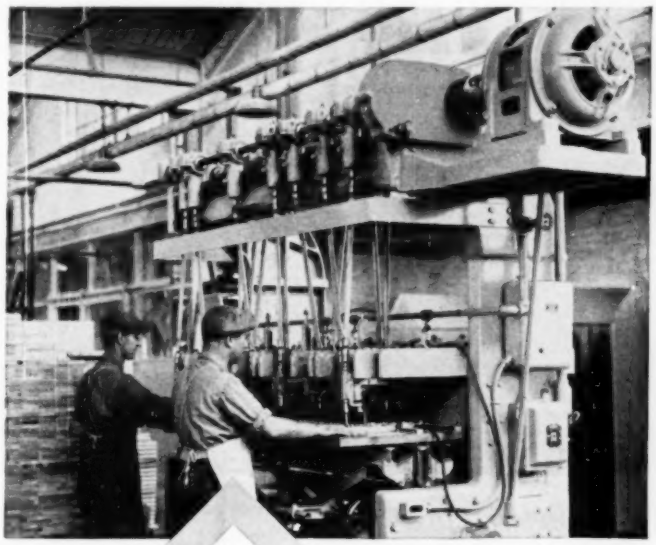
Temple, Texas—Chupik Wood Manufacturing Company, Inc., was granted 50-year-charter of incorporation August 31, 1949. Authorized capital stock was listed at $48,000. Incorporators: Matilda Chupik, H. E. Chupik and S. F. Chupik.

* * *

Amarillo, Texas—Amarillo Seating and Supply Company, manufacturing, was granted 50-year-charter of incorporation September 6, 1949. Incorporators: Lyel Upshaw, J. T. Smallwood and Troy F. Jones. Authorized capital stock was listed at $3,000.

* * *

Alexandria, La.—Bienville Furniture and Manufacturing Company of New Iberia, La., has leased a building at the



again and again . . . accurately-spaced, accurately-bored holes . . . with one quick stroke

Bore all the holes of a part in one operation with a GREENLEE No. 586-C Gang Borer. Its universal spindles can be located at any point over the entire table to produce numerous, precise holes whether located irregularly or in rows. Tailored to fit the exact job, the GREENLEE has a wide variety of spindles and feeds, is built in many lengths, and is easily and quickly set up.

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GREENLEE WOODWORKING MACHINERY: MORTISERS • BORERS • SAWS • TENONERS • PLANERS • SHAPERS • MORTISING and BORING TOOLS

Alexandria Airport, where it will establish a furniture manufacturing and assembling plant about November 1, 1949. According to Morgan Hilton of the firm, the plant here will assemble wood furniture and will be used as a distribution point for the company's products. About 12 workers will be employed at the plant at the start.

* * *

Malvern, Ark.—Sturgis-Flower Flooring Company started construction of a new $150,000 hardwood flooring plant at the old Sturgis mill site on Highway 67. The new plant will be owned and operated by W. T. Sturgis and C. F. Sturgis of Arkadelphia, Ark., and Roy Sturgis and E. E. Fowler, Sr., of Little Rock, Ark.

Chattanooga, Tenn.—"Southern Wood Preserving Co., Chattanooga, has placed in operation a 'straddle carrier,' described as the world's largest, which can move a single stack of crossties, timbers, or poles up to 18 ft. high and over 9 ft. wide weighing up to 20 tons," according to *The Tennessee Newsletter*, September 1, 1949. "The carrier travels on 20-ply pneumatic tires and weighs 13 tons. The operator's seat and controls are 25 feet above the ground. Ross Carrier Co., Benton Harbor, Mich., is builder of the giant machine."

* * *

Marshall, Texas — Snider Brothers Lumber Company, which has operated saw mills in Marshall and Gilmer, Texas, recently purchased a sawmill at Weed, New Mexico, which is in the Sacramento Mountains in the southeastern part of New Mexico, about 100 miles from Carisbad. The mill is now cutting virgin, high-altitude Douglas fir, Ponderosa and Sugar pine at the rate of 100,000 board feet daily, which is being sold all over the nation. The mill is said to be the largest mill in the West not located on a railroad. The lumber is being trucked out. Raymond Snider of Gilmer and Roy Snider of Marshall, are owners and operators.

* * *

Big Sandy, Texas—Fire destroyed the planing mill of the W. D. Green Lumber Company here September 2, 1949. Damage was estimated at $1200.

Northeastern News

By Staff Correspondent

Binghamton, N .Y.—Donald W. Raitt has been promoted to manager of the Woodworking and Rack Assembly plant of the International Business Machines Corp. here. Mr. Raitt has been with the company for 20 years.

* * *

Jamestown, N. Y.—Approximately 75 furniture manufacturers toured four Jamestown wood manufacturing plants during the 1949 Wood Industries Division Conference, American Society of Mechanical Engineers.

The executives visited the Crawford Furniture Manufacturing Corporation, Jamestown - Sterling Corporation, Jamestown Veneer & Panel Corporation and Kling Factories.

Speakers at various sessions were: Earle O. Hultquist, president of Jamestown Royal Upholstery Corporation; G. M. Kline, F. W. Reinhart, National Bureau of Standards; Henry Grinsfelder, Rohm & Haas Company T. D. Perry, Moorsetown, N. J.; W. H. Hickok, Girdler Corporation, Louisville, Ky.; G. E. Helgram, treasurer of Kling Factories; Kenneth Duff, Henry Disston & Sons, Seattle, Wash.; Paul S. Kennedy, vice president finishing division, Interchemical Corporation, Newark, N. J., and W. T. Smith, Interchemical Corporation.

* * *

Lincolnville, Pa.—A large storage building, filled with lumber, was destroyed here Sept. 14 with loss estimated at $15,000. Asa and Morris Shreve, owners of the building, said a short circuit in wiring may have caused the fire.

Huttig Opening New Branch at Nashville

A new distribution plant at Nashville, Tenn., was opened by Huttig Sash & Door Company Oct. 1. It is being acquired on leasehold arrangement, and will represent about $75,000 together with stock. B. E. Langson, district representative of Huttig at Nashville, will be manager of the plant. Company has warehouses and distributing plants at 11 other cities, mostly in the South.

Buffalo, N. Y.—A business name has been filed in the Erie County clerk's office for the Sectional Cabinet Mfg. Co., 87 Stewart St., Buffalo, by Stanley R. Krzyzycki.

from forest to user
Bacon-McMillan
Rotary Cut Veneers

Bacon-McMillan Gum and Bay Poplar Veneers are constantly checked for correct thickness to insure uniformity. Bacon-McMillan can deliver the exact size veneers ordered—in any thickness and any length up to 98 inches.

unlimited timber... 2 mills

Bacon-McMillan owns and cuts its own timber lands and now operates, in addition to its own mill, the Danner Veneer Manufacturing Co. mill in Mobile. Thus, an uninterrupted delivery schedule is maintained regardless of contingencies causing delay of production.

BACON-McMILLAN MANUFACTURING Company
QUALITY VENEERS SINCE 1910
STOCKTON, ALABAMA

These costly evils are completely eliminated in miter joint production through the use of CLAMP NAILS. Simplicity of design prevents any danger of split wood and gives you positive assurance of a perfect joint. Don't continue obsolete and wasteful production methods — mail your trial order today. There is only one genuine CLAMP NAIL.

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ROOT BORING MACHINERY

ONE of Root's Boring Machines — Style G-300 is the only heavy duty power-feed machine on the market today. It is finding continual use for large and deep hole boring and for the cluster boring of many items when equipped with Root-made multiple spindle boring heads.

Root's catalog shows the complete line of boring machines and lumber hoists. Write for Catalog 173C today.

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Quick facts on YELLOW POPLAR

PRESIDENTIAL FAVORITE !

THE STATELY MAGNIFICENT YELLOW POPLAR WAS THE FAVORITE TREE OF F.D.R.

IT IS THE LARGEST OF ALL AMERICAN HARDWOODS OFTEN GROWING UP TO 10 FEET IN DIAMETER AND 200 FEET IN HEIGHT. THE YELLOW POPLAR IS OFTEN CALLED THE "TULIP TREE" BECAUSE OF THE TULIP SHAPED FLOWERS IT BEARS.

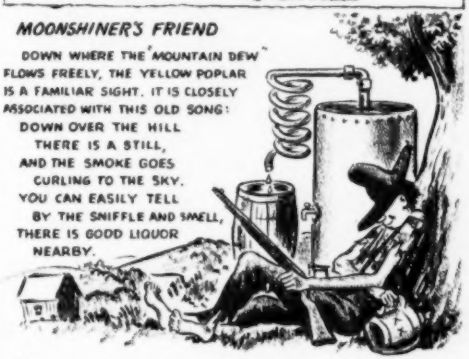
LONG LIVED TULIP TREE

THE HENRY HUDSON TULIP TREE IN MANHATTEN IS BELIEVED TO BE THE ONLY LIVING THING WHICH WAS THERE WHEN THE FAMOUS ENGLISH EXPLORER DISCOVERED THE HUDSON RIVER IN 1609

MOONSHINER'S FRIEND

DOWN WHERE THE MOUNTAIN DEW FLOWS FREELY, THE YELLOW POPLAR IS A FAMILIAR SIGHT. IT IS CLOSELY ASSOCIATED WITH THIS OLD SONG:

DOWN OVER THE HILL
THERE IS A STILL,
AND THE SMOKE GOES
CURLING TO THE SKY.
YOU CAN EASILY TELL
BY THE SNIFFLE AND SMELL,
THERE IS GOOD LIQUOR
NEARBY.



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Out in the shop

Chain Mortising Problems

Part I

A mortising chain is of necessity a delicately-made tool. In the smaller sizes especially, the various links of the mortising chain, fitted with their necessary sharp points and their connecting pins, must be quite small in order to make the required size of mortise and also to incorporate the necessary degree of flexibility. Considering these points, a mortising chain does a very great amount of work in a very short time. Like a saw blade, and unlike knife-type cutters, it is subjected to operating friction on the *sides* of the cutting teeth, as well as on their points, and like a saw, it has a great many points cutting at the same time. This results in greater cutting resistance, and in consequent greater cutting strain on the chain. Yet modern mortising chains are so well made that they break surprisingly few times, when they are being used by an intelligent operator who knows something about the conditions under which they may be most advantageously used.

Breakage of Chains

Although mortising chains do not break as often as might be expected under difficult operating conditions found, breakage is without doubt the greatest single type of trouble experienced at the chain mortiser. There are several factors which may cause, or which may be contributory to chain breakage. Even under the very best working conditions, after chains have become worn, they are more subject to breakage than when they are relatively new. Less metal is left in them from the bottoms of the tooth gullets to the back of the chain. Too, under continual wear, the pins on which the chain links hinge and by which they are connected, inevitably wear in some degree at all points where they bear upon and turn within the links. The links themselves also wear in some degree in their holes at the same points. True, such wear can be held to a minimum by intelligent use and care, but it will occur in some degree regardless of care. When any appreciable amount of play has developed in these bearing surfaces between the chain pins and chain links, there is a continual though relatively gentle impactual effect taking place at these points during operation, which tends to increase the wear still faster. In other words, then, the more the bearing surfaces in a chain are worn, the easier it is for them to wear at a still faster rate.

From this, we have to consider the fact that chains will break more frequently as they become older. Therefore it is well to determine a logical point at which a chain will be thrown away and a new one purchased. While broken chains can be repaired, and while most chain mortiser operators have tools at hand for repairing them, and do repair them, there comes a time when it is more profitable (considering the amount of repair time that must be put on a worn chain) to throw the chain away than to repair it any more. In many shops the interval of running and operating time obtained from a chain between breakages is the most convenient standard for general use in this respect. This method is not available in the shop where a chain mortiser operates intermittently, however. About all one can do in such a shop is to exercise a reasonable amount of good judgment as to when a given chain should be thrown away and another one purchased.

One reason why chains break more frequently than they should in some shops is the fact that operators run a

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The only set-up required on the Nash "85" is adjusting the feed roller to the thickness of stock and regulating pressure for desired stock removal. One side of stock is sanded as it passes through machine, and by simply reversing the piece and feeding it through again, the sanding operation is completed. Feed roller has controlled spring adjustment which maintains a constant pressure on the curved stock. Pressure being variable permits control of stock removal.

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chain too tightly. Many chain mortising machines have carried the exhortation right before the eyes of an operator, "Run the Chain Slack," and yet the operator has run it tighter than it should be. Not only is the chain itself abused when this is done, imposing strong friction and strain on the chain bearing surfaces, but the delicate roller bearing in the end of the chain bar is also subjected to more pressure and wear than it should ever receive when running idle. An idle-running chain should run very freely on the bar. On the chain mortiser, an operator must have his thinking adjusted and reconciled to the fact that the chain will do some "throwing out" as it engages the cut, this throwing out taking place on the downward-traveling strand of the chain.

How Chain Acts in Cut

The mortising chain, receiving its drive from above and from the sprocket around which it runs, meets with no resistance while running idle, if it has the proper amount of operating slack. Therefore, the slack in an idle-running chain is fairly well divided between the two sides of the chain bar. A different set of circumstances is immediately at hand when the chain encounters the cut, however. The cut offers resistance to the travel of the chain, whereupon the sprocket above must pull the chain through the cut. The pulling action of the sprocket on the cutting chain places the up-traveling strand of the chain under tension. The inevitable result is that all of the slack in the chain instantly overruns the sprocket and localizes in the downwardly traveling strand of the chain. This condition of localized slack continues until that one cut of the chain has been finished, whereupon the throwing action of the down-traveling strand of the chain ceases until the chain again enters the cut.

Because mortising chains are made with far greater accuracy during recent years, it is not necessary to adjust them with quite as much running slack as was necessary years ago, but they must still have considerable. With the machine at rest, one should have enough slack to be able to pull the chain away from the chain bar at one side about ¼" in most cases. It is well to turn the sprocket shaft over by hand, to make sure there are no "operating spots" which are tighter than others. If by any chance the chain-sprocket shaft has an appreciable amount of run-out, or wobble, it will cause the chain to be intermittently tight and loose in operation, setting up a pulsating action that is not at all good.

Variation in Chain Length

One factor far to little understood by many chain mortiser operators is the part played at this machine by the expansion of metal as it rises in temperature. Mortising chains are inevitably made of metal. They are inevitably subjected to much friction, both on their points and on the sides of the teeth, while cutting. This friction inevitably raises the temperature of the chain after it has gone into operation, and the resultant expansion inevitably causes the effective length of the chain to be somewhat increased. This in turn loosens the chain on the chain bar. True, some of this temperature rise is transmitted to the chain bar, causing its length to increase very slightly, but the rise in temperature of the bar is so much smaller than that in the chain that what small amount the bar increases in length is nowhere near enough to compensate for increased length of the chain.

If and when an operator understands this, he will not be surprised, after having set the chain with the proper amount of slack initially, to find that it has become too loose after a few pieces of stock have been mortised. He will then stop the machine, adjust the sprocket shaft slightly away from the chain bar to restore the proper amount of slack in the chain, set the machine in operation and resume mortising. He may find it necessary to do this more than once. There comes a point, however, at which the operating temperature of the mortising chain will rise no higher. When this point has been reached, and the proper amount of operating slack is concurrently in the mortising chain, there will be no further change until after the complete run of mortising has been finished.

However, when a long run of mortising has been finished, and when the chain mortiser will be left standing idle for a brief interval of time, it is in order to adjust the chain so it is *exceedingly* slack, as soon as the machine has come to rest. If this is neglected, the chain will pull up exceedingly tight as it cools and shrinks. This results in a strong pull on the delicate roller bearing in the end of

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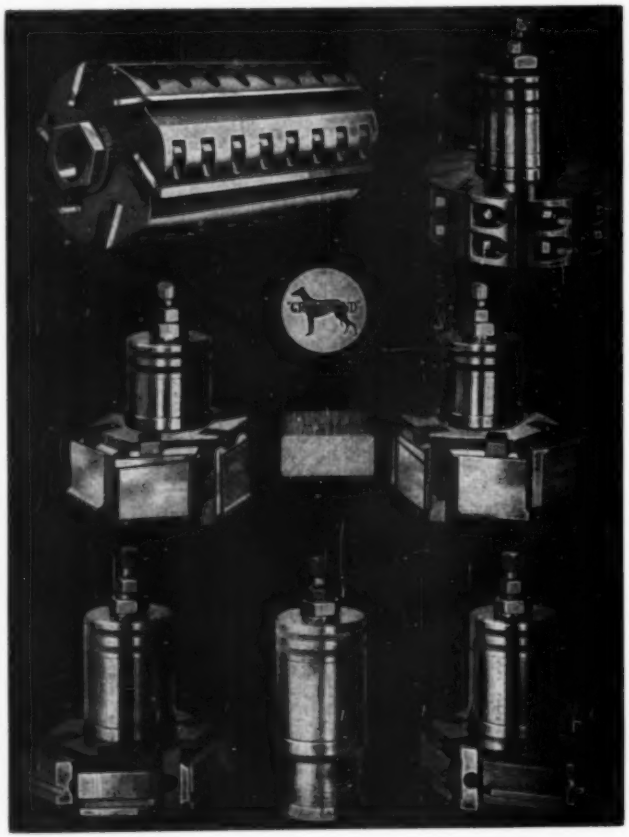

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the chain bar, and in a corresponding strong pull on the relatively-delicate sprocket shaft. Doubtless many a chain mortiser sprocket shaft which ran with perfect truth when the machine was first installed has been sprung in this very manner, to a point where it will always afterward have a modicum of runout, and thus set up the undesirable pulsating action of the running chain before mentioned.

Northern Lumbermen Meet at Land O' Lakes

With weather cooperating, an impressive program of business and enjoyable entertainment features, 150 members of the Northern Hemlock and Hardwood Manufacturers Association, wives and guests met at King's Gateway Hotel, Land O' Lakes, Wisconsin, on September 9th and 10th to greet Senator Alexander Wiley and review business conditions.

Russell Taylor, business analyst of the National Association of Manufacturers of New York City displayed graphically the significant trends influencing current conditions. Among encouraging factors is the fact that physical output is still twice that of any other peace time year. Because there is very little increase in output per man hour the labor costs in manufacturing are twice as high as the prewar period. As the price trends, farm prices which broke 18 months ago are still far ahead, and exclusive of the "leveling-off" period there has been only a 9% drop in prices exclusive of farm and food. The employment situation is encouraging and wages remain abreast of cost of living.

R. A. Colgan, executive vice president, National Lumber Manufacturers Association, Washington, said the lumber situation was on the whole encouraging; that increases in mill stocks in the principal producers districts have been checked. Now is the time for aggressive and firm selling.

O. T. Swan, secretary-manager, reviewed conditions prevailing in the North which can be summed up in the conclusion that while stocks have increased slightly there is still a decidedly limited amount of dry lumber on hand in both softwoods and hardwoods, far less than is needed to supply the local market.

Frank Zaug, American Plywood Company, dean of the plywood industry, said that the infection of "inventory-itis" which had dominated the activities of purchasers was very much improved and he looked forward to better business, M .C. McIver, Penokee Veneer Company, said the importation of Canadian plywood was causing some industrial distress.

In the mens' golf tournament Sam Wells of Menominee, Michigan, defeated Matt Wallrich of Shawano, Wisconsin in a play-off for possession of the Chas. Good cup, and prizes were won by Frank Leslie, Harry Erickson, Dave Seehafer, Matt Wallrich, John Boehm, George Hodgdon, Dick Colgan and O. T. Swan.

This meeting was one of the best attended and most successful in the history of the Association.

Jones Heads Tie Makers

Elmo W. Jones, treasurer of the T. J. Moss Tie Co., was elected president of the Railway Tie Asosciation, a national group of manufacturers, at the close of its annual convention, Sept. 4, in Memphis, Tenn.

Other new officers are W. P. Arnold of Pittsburgh, Pa., and J. R. Keig of Beaumont, Tex., vice presidents.

Convert Basket Plant to Plywood, Veneer Mfg.

Lowville, N. Y.—The Lowville Veneer Works is being established at South State street, in what was once the John Bacon basket factory. Approximately 50 persons will work in the new plant, it is reported.

The owners are the American Seating Company, Grand Rapids, Mich. Conversion of the old basket plant to its new function is still in process.

High quality birch plywood veneer for school, theater and other types of seats will be produced. Black River timber will be used to a large extent.

New Hardwood Plywood Standards Being Considered

The National Bureau of Standards has submitted to producers, distributors and users of hardwood plywood a recommended revision of Hardwood Plywood Commercial Standard CS35-47. *Bureau of Standards TS-4852 12.3, Commerce Department.*

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MARKETS ★ FINANCIAL NEWS ★ PRICES

July Shows Marked Gain In Lumber Industry

Reports from various parts of the country indicate a marked improvement in the lumber market the last two weeks in July, according to the 73rd Quarterly Report of the Lumber Survey Committee to the Secretary of Commerce. The upswing in building and construction has been reflected in a steady increase of sales in the retail lumber yards.

In the report, total production in the second quarter of 1949 was estimated to be 8,122 million board feet, 16.5 percent more than in the first quarter, but 11.3 percent below the output in the second quarter of 1948.

The rapid increase in mill stocks has apparently been checked, according to the Committee. Inventories, which had increased nearly 40 percent during the four previous quarters, showed an increase of only 1.3 percent during the second quarter of 1949.

The report states that with a further decline in prices during the second quarter, many additional marginal mills discontinued operations, and a large proportion of the better established mills operated on shorter hours.

The Committee states that lumber producers are encouraged by the upswing in building, as new housing has shown a month by month increase. In June, 100,000 new homes were started, 2,200 more than in June, 1948; and preliminary figures for July exceed those of the previous July. Housing starts in the first half of 1949 were 5.6 percent below the 1948 levels, but 26.9 percent above 1947.

The Committee reports that since last August, wholesale prices of construction lumber have declined an average of 1.2 percent a month.

Atlas Announces New Low-Cost Lacquer Enamels

Introduction of new line of low-cost gloss *lacquer* enamels for manufacturers of wooden toys, chain store household items and novelties has been announced by the Industrial Finishes Department of Atlas Powder Company, Stamford, Connecticut and North Chicago, Illinois. The new product, known as Zapon 401-191, may also be used on pretreated or primed metal.

Formulated for either spray or dip application, this grade possesses unusually good adhesion to wood, it is claimed. It air dries with normal lacquer speed, producing a tough, durable finish and is available in all colors.

Canada Lbr. Cut Up

Ottawa—A 15 per cent increase in the Canadian production of sawn lumber during the first half of 1949 was reported today by the Federal Statistics Bureau. Output amounted to 824,858,000 feet board measure, compared with 714,031,000 in the same period last year.

Casket Shipments Off 15% In Second Quarter

Manufacturers' shipments of wooden caskets during the second quarter of 1949 were 10.0 percent less than in the second quarter of 1949, and 6.0 percent less than in the second quarter of 1948. During the quarter, 77.5 percent of the shipments were wood caskets as compared with 82.1 percent in the first quarter and 79.0 percent in the second quarter of 1948. Shipments of metal caskets were 20.0 percent more than in the first quarter, and 2.5 percent more than in the second quarter of 1948.

Estimated consumption of lumber in the casket industry in the first quarter of 1949 was 46 million feet, as compared with 49 million feet in the first quarter of 1949, and 48 million feet in the second quarter of 1948.

Plywood Imports, U. K.

United Kingdom plywood imports in the 6-month period January to June 1949 totaled 3,505,916 cubic feet compared with 3,523,895 cubic feet in the corresponding period of 1948. Imports from Canada and the United States dropped sharply, whereas imports from other sources, particularly Finland and Sweden, increased substantially. Imports during January to June 1948 and 1949, by country of origin, are shown in the accompanying table:

Big Plywood Firm Sees Business Better

New York, Oct. 1—Lawrence Ottinger, president of United States Plywood Corporation, reported a recent decided change for the better in the plywood industry following a sharp price decline early this year.

The company reported net profit of $570,000, or 37 cents a share, for the quarter ended July 31, excluding its equity in earnings of companies not consolidated. This compared with $2,077,700, or $1.45, for the like quarter last year. Net sales in the 1949 quarter were $14,765,000, against $16,660,000 in the comparable period last year.

Furniture Plants Busier in Buffalo, N. Y., Area

Buffalo, N. Y.—Local furniture manufacturing companies are boosting production activities as a result of a recent improvement in orders.

"The rise has been especially noticeable since Labor Day," said Executive Vice President Fred J. Batson of Kittinger Co., Inc. "Part of our plant is back on a 48-hour week." The plant previously was on a 40-hour week.

President Francis B. Bacon of The Sikes Co., Inc., reported: "We're really busy. Orders coming in are very encouraging. We have 200 workers now and we will be putting on some more."

Low Dealer Stocks Move Furniture Production Rate Upward; Seidman

The improvement in demand for furniture at the manufacturer's level which first became apparent in late July, carried through in August.

It is becoming clear that for several months furniture dealers have been selling more than they have been buying and that they have materially cut their stocks. Now, many of them are finding that they have lived off inventories as long as they could—in some cases parhaps too long—and are rushing back into the markets to replenish depleted stocks and supply urgent needs. Thus, while inventory liquidation started the "recession" in the industry, an inventory boomlet appears to be ending it.

If one is to judge from the evidence of generally improved business sentiment, the furniture outlook for the remainder of the year lends itself to considerable optimism. While a return to the high levels of demand of mid-1948 does not appear to be in the offing, nevertheless, the fall and winter furniture trade should be very satisfactory.

Good August Bookings

A majority of the plants reporting actually booked more new business in August 1949 than in the market month of July, and the total orders for the month (dollars) were only 2% less than the July orders. As compared with August 1948, the dollar volume was within 5%. August bookings were, in fact, the most satisfactory since the first quarter of the year.

Total business booked in the first eight months of 1949 was 22% less than that taken last year in the same period. This is a two-point gain as compared with the situation at July 31.

Shipments in August registered an increase of 64% over those of July, but fell 10% below August 1948 shipments. For the eight months, shipments were down 19%, as compared with 21% at the end of seven months. Cancellations in August were subnormal, amounting to only 4% of the amount of orders booked.

Hours, Payrolls Up

Notwithstanding the heavy shipments in August, unfilled orders at the end of the month had increased by 9% as compared with the end of July, but amounted to only about one-half of the backlog at August 31, 1948.

Dollar payrolls increased 19% in August—partly because of vacations in July—but were 8% below August 1948 payrolls. The number of employees on the rolls increased about 4% but did not reach the August 1948 employment figure by 9%. Plant time was back to an average of 41 hours per week in August, the highest for any month since April. This compares, however, with 44 hours per week in August 1948.

R. R. Tie Purchases In '48

Purchases of cross ties by Class I railroads in 1948 amounted to $87,916,000, a decrease of 4.2 percent from 1947. Purchase of switch ties totalled $12,700,000, a decrease of 15.6 percent from 1947. Inventories of cross ties increased 21 percent during the last five months of 1948.

Pickering Lumber Dividend

Directors of Pickering Lumber corporation yesterday declared a dividend of 50 cents a share on the common stock, payable October 4 to holders of record September 28. A like amount was paid in the previous quarter.

Shingle Shipments

July shipments of shingles and shakes amounted to 258,467 squares, against June shipments of 303,366 squares and July, 1948 shipments of 295,274 squares.

Monsanto Appoints Wood

Boston, Mass.—Horace Wood Jr. of Milton, Mass., has been appointed a sales development representative of the surface coatings department of Monsanto Chemical Company's Merrimac Division.

A veteran of overseas service in the U. S. Navy during the recent war, Mr. Wood joined Monsanto in August, 1946, after employment with the U. S. Rubber Company.

Concealed Nailing Features Plankweld Wood Panels

Plans for national distribution of Plankweld, a factory finished plywood panel, were announced last week by the U. S. Plywood Corporation.

S. W. Anteville, vice president and director of sales for the plywood manufacturer, described the product as a factory finished hardwood plywood, ¼" thick, 16'-¼" wide by 8' long, and grooved at each long edge to permit easy installation. He stated that Plankweld was designed particularly for erection over existing walls as the groove of each Plankweld panel is slipped into that of the adjoining one.

Simple metal clips along with nailing are all that are needed to install these panels. This means that face-nailing is unnecessary, Mr. Antoville continued, and since the paneling is factory finished a remarkably quick and low-cost installation is possible. These panels can be used for new installations but can also be very easily put up over existing construction.

Obituary

Lloyd H. Lucas

Warren, Ark.—Lloyd Hill Lucas, 60, manager of the Sallee Hardwood Products Co., died September 19.

He is survived by his wife, two sons and five sisters.

Henry F. G. Schmidt

Ponchatoula, La.—Henry F. G. Schmidt, 78, prominent resident of this area and former superintendent for 45 years of the New Orleans Furniture Manufacturing Company, died Sept. 6 at his home here following a long illness.

George Byron Scott

Winneconne, Wis. — George Byron Scott, once active in the lumber business in Upper Michigan and the state of Washington, died at his home here August 29, after a brief illness, at the age of 78.

Mr. Scott operated a lumber mill at Tacoma, Wash., twenty-five years before retiring in 1938. Previously he had been manager of the Scott & Howe Lumber Mills in Ironwood, Mich.

Myra S. Burleigh

Dermott, Ark., Sept. 11—Myra Sherer Burleigh, 72, operator of the Burleigh Manufacturing Co., which made handles and dimension stock for export, with an office in Glascow, Scotland, died at his home here last night.

The son of Bennett Burleigh, a famous war correspondent who covered the Boer War in Africa for the New York Herald, he was born in Brooklyn and reared in London.

He himself fought in the Boer War with English forces in attempting to put down colonial rebellion, before coming here in 1902.

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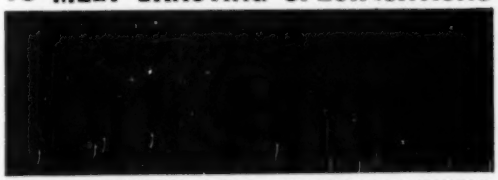

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The new heavy duty staple has a wider crown (½ inch) and leg lengths up to ⅞ inch. Staples are cohered in sticks for quick loading into the Spotnailer magazine. Made by Spotnails, Inc., Evanston, Ill.

Anderson Leaves Borden's

Nils Anderson, Jr., has left his position as vice president of the Borden Company's Chemical Division to become vice president of Debevoise-Anderson Company, New York City. In making the move, he joins his father, Nils Anderson, Sr., president of the Debevoise - Anderson Company which he helped establish in 1905.

Before the war, Mr. Anderson, Jr., was with the Bakelite Corporation, and later became a director of Debevoise-Anderson, a post which he still holds. Called to Washington in 1941, he was made chief of the Adhesive Unit of the Office of Production Management where he served until his apointment as chief of the Plastics Section of the War Production Board's Chemical Bureau.

He joined Borden's in 1945, becoming vice president of the Casein Company of America, as the Chemical Division was then known.

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Cincinnati Lbr. Golfers Hold 30th Outing

The Cincinnati Lumbermen's Golf Association held their 30th Annual Golf Tournament at the Western Hills Country Club and the low gross for 36 holes was won by Tom Mulvaney of United States Plywood Company with 144 and the runner-up was won by Fred Critchell with 148. About 100 members and guests participated.

New officers elected were: Sam Piates (The Mowbray & Robinson Lumber Co.), President; Wm. Maescher (Kirkpatrick Lumber Company), vice-president; Maury Mims (Thames Lumber Company), secretary-treasurer.

Statement of the Ownership, Management, Circulation, Etc., Required by the Acts of Congress of August 24, 1912, and March 3, 1933.

Of Wood Products, published monthly at Waukegan, Illinois, for October, 1949.

State of Illinois, County of Cook—ss.

Before me, a notary public in and for the State and County aforesaid, personally appeared M. B. Pendleton, who, having been duly sworn according to law, deposes and says that he is the business manager of Wood Products and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication, for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Lumber Buyers Publishing Co., Inc., 431 So. Dearborn St., Chicago 5, Ill.

Editor—M. B. Pendleton, 431 So. Dearborn St., Chicago, Ill.

Managing Editor—M. B. Pendleton, 431 So. Dearborn St., Chicago 5, Ill.

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2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

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5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is: (This information is required from daily publications only.)

M. B. PENDLETON,
Business Manager.

Sworn to and subscribed before me this 30th day of September, 1949.

(My commission expires July 17, 1951.)

(Seal) C. M. LYNN.

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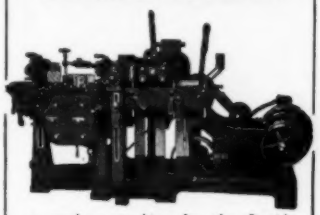
BEARING MOULDER



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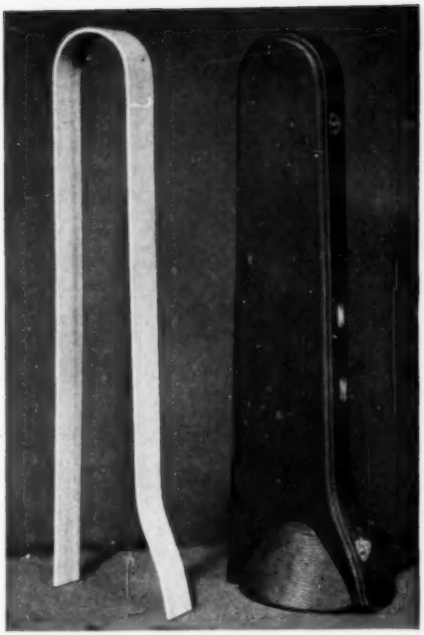

1. The frame for this trombone case used to be made from four separate pieces: two straight, one steam-bent and one band-sawed, all finger-jointed together. The assembly cost around $2.50 each.

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2. Band-sawed boards are laminated with heat-proof CASCOPHEN glue to make a male form. A smooth molding surface is obtained by covering the form with thin hardwood plywood. The width of the form depends on stock veneer sizes and production requirements. The form shown produces a molding wide enough for 4 frames.

3. Close-up of complete assembly ready for molding. Left to right: Wood form with plywood surface, aluminum sheet to reflect heat, glue-coated veneers, USKON* heating unit (conductive rubber), outer form made of molded plywood.

(The USKON rubber, heated by resistance, reaches a temperature of around 180° F. For faster production, USKON units can be used on both sides of the veneers.)

*Manufactured by U. S. Rubber Co.

4. Pressure is applied with simple bolt clamps—first at the top, then progressively down the sides.

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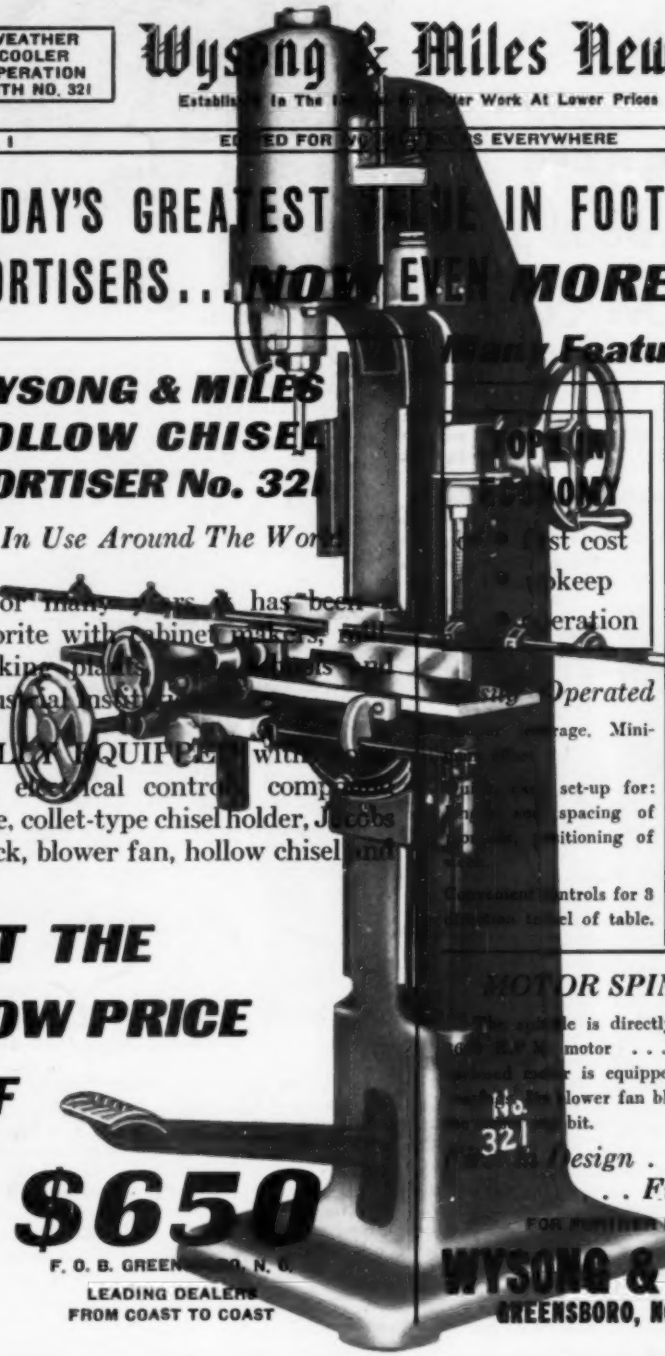

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